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Working Papers on Global Restructuring

prepared by the
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INTRODUCTION

A. Purpose of the Study

This study examines the reorganization of a global oligopoly in a period of crisis. It analyzes the range of methods employed by giant corporations to alter the division of labour. These methods have been adopted simultaneously, but with differing degrees of intensity and to achieve diverse aims. The study shows that the crisis has its beneficiaries; and that these are the same corporate entities who claim to be the victims. Those whose position has been weakened are the labour force, particularly unskilled and semi-skilled persons, governments with regard to their bargaining power against the corporations, and in particular the countries of the Third World whose position in the corporate structure has been dramatically altered in recent years.

Serious obstacles confront the corporations as they seek to implement these changes. First, apart from the Japanese firms, all other international leaders are under financial pressure - the combination of sharply reduced sales and the costs of new investment has forced them into substantial external borrowing. Hence the ability to mobilize adequate financial resources will be a critical issue in competition and bargaining in the remainder of this decade. Second, although drastic employment cuts have been effected in the past five years with apparently limited reactions from organized labour, it seems most unlikely that further reshaping of the labour force could proceed without major disputes. Third, public funds are being poured into the industry on a substantial scale in both OECD and developing countries (DC); it is an open question as to how long such transfers can continue without reactions. Fourth, it is still not clear that the corporations themselves have either fully determined their own strategies or that they have adequately mastered the technical and organizational requirements associated with the fresh technological and market conditions in which they operate. Their ability to handle these problems will have a powerful influence both on competition among them and on the relations of the automotive industry with the rest of the economy.

An attempt is made to sketch the main tendencies at work and to indicate the severe limits to policy in the present circumstances. Indeed the study suggests that the very meaning of policy as well as who formulates it and what it is really trying to achieve require reconsideration in the automotive industry. The scope of the study includes passenger cars, commercial vehicles and the components industry. Most of the observations will be, however, concerned with cars and components. The reason for this is that the forces at work in car production indicate most clearly the nature of current reorganization and that these are the areas in which most production in the Third World, still takes place. This is not to deny that the public importance of the commercial vehicle branch of the industry is not substantial in the Third World but rather to suggest that the changes there are likely to follow in the wake of the reorganization of car production. Finally, as is well known, the distinction between manufacturing and assembly in the industry is not a particularly sharp one. In this report we will follow conventional usage and treat manufacturing as applying to all those cases where at least some components of significance are manufactured locally.

B. The Importance of the Automotive Industry

By any measure, the automotive industry ranks as one of the most important sectors of the economies. Notwithstand the severe cutbacks in recent years, total employment generated by the industry on a world scale remains substantial. Some estimates suggest that about 3.5 million people are directly involved in the manufacture and assembly of vehicles and components while perhaps another 7 million are indirectly earning their living from the industry.[1/] On an individual country basis, the sector is of major significance. "In the early 70's the industry accounted for between 5% and 8% of manufacturing output, investment and employment in the Federal Republic of Germany, UK, France and Italy and over 10% of manufactured exports.

If one also includes the employment in the industries producing raw materials...and capital goods inputs, then in the EEC some 3.1 million employed depend on the car industry for their livelihood, or 10% of those employed in manufacturing."[2/] More recent data show that in the Federal Republic of Germany (FRG) some one in seven jobs are linked to the motor industry; of Japan's total labour force, about one in every ten workers is involved in production directly or indirectly related to automobiles, and the proportion is not that much lower in other major OECD manufacturers. For the developing countries its weight is also appreciable; in those countries where large scale production takes place, it may account for around 10% of industrial value added.

The linkage effects of the industry are generally reckoned as very considerable. Late 1970s data for the US show that the auto industry used one-fifth of all steel produced, some 60% of all the rubber and a substantial proportion of glass output.[3/] Similar proportions have been observed for the EEC region: "some 20% of all steel and machine tools produced in the community, together with 5% of all glass and roughly 15% of all rubber, are intended for the auto industry... for every one job provided by the car makers themselves roughly two more are created earlier in the chain... to date, the auto industry's weight as a major customer for the basic industries has been more significant than any qualitative improvements."[4/]

It is an industry whose importance is such that it has, on occasion, appeared to outstrip all others; even at the beginning of the present decade, for example, there was much discussion in France of what appeared to be the country's 'mono-industry'.[5/] In their long history - General Motors (GM) celebrated in September this year its 75th anniversary and Nissan has likewise completed 50 years since its foundation - leading firms in the industry have recorded, until recently, substantial profits on a year to year basis. Indeed, when GM announced a loss in 1980 it was the first time since the beginning of the 1920s that such an event had occurred. For the most part diversification by the major firms has been quite limited and they do not yet have the conglomerate character distinctive of so many other transnational corporations (TNC).[6/]

The motor vehicle has been transformed into the consumer's dream of the twentieth century and its use has been extended, with surprisingly few barriers, to all countries of the world. The consequences of this spread have been felt at many levels: government expenditures on road systems, receipts from diverse taxes connected with vehicle use, the significance of road transport as a major conveyor of goods, pollution and many other things are all intimately related to the spread of the industry and its products. More particularly, the impacts on labour organization and politics have been profound. In most countries where the industry has flourished, large industrial plants concentrating thousands of workers have been the norm. Due to the working conditions these plants have frequently been the epicentres of fierce industrial disputes and in several cases these struggles have set the pace for other industrial and political conflicts.

With all that the industry is now going through a period of deep crisis. More accurately, and this is one of the theses of this study, it is in the midst of several crises. Those crises have their victims but also their beneficiaries. The study will argue that, although some important firms in the industry may well disappear or be absorbed during the present decade, the oligopoly as a whole is accentuating its grasp at the global level. The labour force is one of the major losers and the developing countries another. Through the crisis the industry is in the process of reaffirming its time-honoured role as a pioneer. In the days of Henry Ford it was the auto industry which established the mass assembly line with its detailed division of labour subject to the stopwatch, which set levels of industrial wages that were difficult for other industries to follow, which was in the lead with international investment in manufacturing industry.

Nowadays it is once more a pioneer. This time its leadership role comes through the massive incorporation of new technologies which are trying to combine mass production with custom-made goods. The automated factory is not a vision of the future but already exists in the auto field.[7/] In taking on this mantle the industry is redefining its own norms of production as well as setting norms which other industries are likely to follow. The nature of interindustry linkages is likewise in the early stages of a profound transformation and, to the extent that the auto industry is a pioneer, it will shape many of the new structures. Moreover, the transnationalization process is reaching new levels of complexity as the auto TNC grope towards production and consumption integration on hitherto unprecedented levels. As this occurs, so relationships not only with labour forces but also governments across the globe are redefined.

C. The Confluence of Crises

1. The structural crisis

For at least the past decade the world system has been in acute and deepening turmoil. At root the crisis is one of overproduction and is in part a response to the relative success of the labour struggle in the 1960s and early 1970s to improve its condition. The structural rifts have been sharpened by a series of systemic shocks, beginning with the rise in the price of petroleum and continuing with, among other things, the expansion of debt on levels never before seen internationally. Within areas of more specific concern to the auto industry, the slowdown in population increase in the OECD countries combined with the slow income growth to yield particularly low rates of sales.

As this was occurring, so the Japanese industry was reaching a stage where its well-organized systems could break through to the world market.[8/] Hence the struggle for market shares has been greatly heightened at precisely the period when growth is minimal. This circumstance, connected with the deeper structural features mentioned above, has put the industry (or at least some of the firms in it) into a battle for survival. The Chrysler story in the US, the prolonged agony of British Leyland (BL) in the UK, the acute difficulties of Fiat in Italy, and the growing problems of Peugeot in France are the best known cases. Ever since the early years the auto industry in the OECD was a tough one to enter - nowadays it's even tougher to stay in. The stakes are high and the costs of mistakes still higher.

2. Government policy

The foregoing should make it clear that there is a crisis for government policy. To what extent should governments support the industry? In what ways? Given that the sector is still regarded, rightly or wrongly, as a strategic one[9/], how far should governments go in pushing for local content (LC)? In current conditions LC has a dual nature: in developing countries it is used as a policy tool in an endeavour to increase internal integration, whereas in the OECD countries recent disputes over LC centre around the desire of local groups, particularly labour and component producers, to hold onto as much local output as possible. In both cases, however, LC has become a policy pivot affecting the international location of various kinds of automotive production, trade both within firms and across countries, and the international location of employment. There is a conflict between the transnationalization process and the attempts to limit trade; should governments promote the one and neglect the other? If they do, will the industry cease to be strategic? These problems must be faced both in the OECD and in developing countries. Indeed one theme of the policy parts of this report is that the predicament has common features whether one examines Australia or Canada, Brazil or Mexico.[10/]

3. The automotive industry, international division of labour and domestic industrial structure

What is the role of the auto industry in the current international division of labour (IDL)? Much was made in the middle and late seventies of the global hunt for cheap labour[11/]; and while the debate focused on such industries as textiles and electronics, the partitioning of the production process which has hitherto characterized the auto sector means that it too lends itself to global sourcing. But the circumstances in the auto sector now are quite different from those which prevailed in other sectors in the recent past. The technological changes, discussed in detail in subsequent chapters, are tending to reduce the scope for the traditional type of foreign investment. Indeed, under the new conditions of productivity, the likelihood is that the real cost of external production (i.e., when account is taken of productivity levels and transport costs) may not be much lower in the principal developing countries' locations than it is within main OECD centres. Consequently, the impacts of the automotive industry on the IDL in the present phase may have to be sought in areas other than the cheap labour realm. Insofar as cheap labour matters, the question is to what extent and where will TNC pursue this in the remainder of the 1980s?

On a different level, the industry has often been regarded as a growth pole and its establishment in a particular location heralded as the beginning of regional growth.[12/] Can this interpretation be maintained in the transnational setting? More generally, the issue of corporate strategy and oligopolistic survival in a period of crisis is a critical one. To date there has been a tendency to look at one dimensional pictures of how TNC adapt to, and strive to benefit from, a period in which their market shares are under severe pressure. The position taken in this study is that the auto TNC are exploiting various routes simultaneously and that it is impossible to understand the import of their actions without analyzing the range of instruments which they themselves utilize. The leaders of the oligopoly are consciously heightening the struggle so that other firms are weakened, organized labour is weakened, and the bargaining power of governments is weakened. In so doing, they are transforming the bases of the IDL in ways which have the most serious consequences for the periphery. Indeed, the industry is managing to redefine the periphery to include substantial parts of the OECD as well as the Third World.

D. The Plan of the Study

The first chapter presents, in outline form, the evolution of the industry on a world scale. Chapter II describes recent trends in greater detail and serves to set the scene for subsequent chapters. The focus of those chapters is primarily on the nature of corporate response to the crisis and examines three dimensions of that response; Chapter III analyses the incorporation of new technology, Chapter IV considers the radical changes which are taking place with regard to relations both in and outside the plant and concerning labour as well as supplier firms; and Chapter V puts the emphasis on international activities of the TNCs including collaboration among them and the search for off-shore labour and goverment subsidies to production and trade. The next chapter tries to bring together these dimensions of corporate behaviour to suggest some scenarios within which the industry may develop in the next few years. The argument here will be not that one single scenario will describe the totality, but rather that elements from each of them may affect different parts of the industry in diverse ways and at different times. It is only within this context that the situation of, and prospects for the developing countries can be understood. Chapter VII examines contemporary developments in the developing countries and tries to spell out the policy measures which have marked their attempts to build up the auto industry. Chapter VIII looks at the experience of a small number of these countries with a view both to elucidating the problems which confront them and to capturing some of the more recent developments on a global scale. This information forms part of the foundation for Chapter IX which considers the strategic options, such as they are, available to the developing countries. The concluding chapter tries to summarize the major findings of the study.

CHAPTER I

THE EVOLUTION OF THE AUTOMOTIVE INDUSTRY ON A WORLD SCALE

A. The Initial Phase

In its early years in the US and Britain the industry was characterized by a flood of entrants. At the beginning both technology and capital costs were relatively easy to command and the new manufacture attracted many groups. In the US, for example, there were 12 assembly firms in 1902 but 181 by 1910; even in 1923, after Ford had introduced mass production methods, there were still 108 in operation. Drastic reductions came soon afterwards, howeer, and there were only 35 firms left by 1931 and only 12 by 1941. Similar figures hold for the UK as well as for other countries where the auto industry acted as a magnet (e.g. Sweden). The rapid slimming down process which marked those early years stands in contrast to subsequent developments in the developing countries where the industry often began with only one or two entities and then, particularly in the late 1950s and early 1960s, increased in numbers.

By the 1920s the international thrust had already begun to take shape (in fact Ford set up its first plant in Argentina as early as 1916). Initially there were exports which, towards the end of the decade, were running at some 0.5 million vehicles from the US to Europe, with around 0.2 million assembled abroad. Shortly thereafter the direct foreign investment process began in earnest as far as the West European countries were concerned - by the mid-1930s Ford was established in Britain, Germany and France, and GM in the first two.[1/] Both companies, moreover, had established operations in Japan although they were effectively removed from that country by an automotive policy elaborated in the mid-1930s.

It is worth stressing that these investments were, more or less from the outset, entirely foreign-owned. Neither then nor subsequently has the industry shown much propensity to combine or replace direct investment by technology sales.[2/] There seems little reason to doubt that, in several ways, the auto sector was establishing patterns for industrial growth which were to be followed in numerous countries. The US firms were building on their enormous domestic market potential, their command over mass production technology, and the dramatic increase in the strength of the US economy compared to the main European centres which became so obvious following 1918. The flow of trade and investment was very much a one way affair, and the market structure of the recipient countries was already, by the 1930s, beginning to be shaped by the firms under foreign control.

This initial phase was defined, above all, by the consolidation of a production norm, embodied in the word 'Fordism'. From this point onwards it would only be possible for an enterprise to survive in a large domestic market, let alone in the international field, provided it adopted the production methods inherent in that system. Those methods were very much aimed at factory organization and had much less of an impact on the whole industrial system; this is in contradistinction to the total system emphasis developed in the 1950s and 1960s in Japan. At the corporate level the changes wrought by Sloan at GM set the standards for organization, while Ford did make some attempts to develop a closely integrated, non-competetive supplier system in the complex established around the Rouge steel plant. But the latter attempt did not take root and, instead, the US industry followed the path of essentially competitive and non-collaborative arrangements between vehicle and component suppliers. The concept of international norms or standards is emphasized here since it will be argued in this study that the present period is precisely one where all producers are striving to attain qualitatively different norms in terms of system organization, product design and performance, process organization and internationalization of production. Yet in the first decades the grip was established and extended internationally; the survivors in the industry were those who conformed best to the norms.

The conception of the industry as a strategic one was relatively slow in coming in Europe. While in the US the expansion had taken place in a framework of strong overall growth (at least until the end of the 1920s), the European-owned firms were developing in a more uncertain environment. Government involvement was mainly defensive and the notion that it could be the crucial impetus for the industry was slow in coming.[3/] The switch occurred with the economic nationalism promoted by the government in Nazi Germany and the experience in that phase has, explicitly or implicitly, influenced subsequent behaviour in other countries.[4/] "It was only during the Nazi period that the government had an impact on the industry through foreign exchange and import controls, export requirements, controls on wages, prices, etc. and programmes to standardize components and encourage the use of interchangeable parts. The two foreign firms were by then well established and in a good position to respond to these directives. The only thing that they could not offer the Nazi regime was a national champion able to symbolize German industrial power to the world. The government called on Dr. Porsche to design a small car for the masses and created Volkswagen (VW) in 1937. Previous design studies by Ford and GM for a similar sized car were dismissed in favour of creating a new German company that could stand on its own in competition with the foreigners. Though the VW did not enter civilian production until after the collapse of the government that nurtured it, Germany at last had its national champion."[5/] The German decision contains many of the elements around which subsequent debates and policy measures have revolved. To what extent can trade and price controls influence the behaviour of an oligopolistic sector dominated by foreign capital? How far can the standardization of parts be taken? How can domestic design capabilities be built up? What is required to create a national champion? These points will recur through the study.

B. Internationalization and the Consolidation of Oligopoly

During the 1939-45 war much of the existing auto production capacity was switched to military ends, particularly aircraft manufacture. In various ways the military connection has remained,[6] both in terms of design work (for example, Saab-Scania developed some of its work on aerodynamism and instrument panels from this source) and in industrial organization. The real expansion of the industry, however, came in the 1950s and 1960s as a much freer regime of trade and exchange was created and most especially as the core parts of the world system expanded rapidly. In that time the advantages of large-scale production consistent with the earlier norms were highlighted still more and this led to even greater reductions in the numbers of firms in the industry.

Thus by 1954 the US market had shrunk to only 6 enterprises; in the UK the locally owned firms could be counted on less than the fingers of one hand; in France the state owned Renault had been set up in 1946 and, along with the private companies Peugeot and Citroen, dominated the market; while in both FRG and Italy a single mass producer was living only with a small number of specialist producers. Hence, even when account is taken of the presence of large foreign companies in UK and FRG, the degree of market concentration was very high. That market structure was thus characterized by strong control in relatively segmented markets.[7]

The internationalization was particularly rapid in this phase, above all with US investment primarily in Western Europe and, to a much lesser extent and in less significant ways, in Latin America. There was also a certain amount of investment by the European firms in Latin America; but the bulk of their activity was focused on Spain and Yugoslavia, accompanied by collaboration arrangements and buy-back trade in Eastern Europe. Until the end of the 1960s the extent of Japanese involvement in the world market was still small.[8] Hence the overall structure remained that of segmented market areas, countries with intensive foreign capital involvement (above all Europe), and international trade in complete vehicles. In this setting the patterns of long as well as short-term decision making were those which normally characterise an oligopoly. Technology changed in incremental fashion, prices were set by the heads of the oligopoly, consumption norms continued to differ from market to market, and the process of merger and absorption of enterprises went on to whittle down still further the number of producers. It was that setting which, in broad terms, existed up to the present phase of acute crisis and massive industrial reorganization.

C. Crisis and Reorganization

Since the late 1970s the auto industry has come under severe pressure. There has been a sharp fall in demand for its products and a change in the character of demand - in most markets purchases have moved towards small vehicles. Competition from imports, not only Japanese but from practically all the major producers, has increased enormously such that the internal markets of all OECD countries (except Japan) are now the terrain of rapidly shifting market shares. The intra-trade of the major TNCs, especially within the European setting, has expanded dramatically and indeed we are now in a situation where, for example, although Ford has some 30% market share in the UK, a good proportion of that comes from other European countries where the same company has subsidiaries.9/

The sharp rise in trade, with a growing proportion of it as components rather than fully built-up vehicles, has been a response to cost and price differentials. Contrary to what is often asserted, however, the Japanese producers have not reduced their prices by anything like the differential that their edge in costs would warrant - their competition is now as much in quality as in price. Furthermore, there are important cost and price differentials among the European producers, due both to productivity margins as between European affiliates of the TNC and to tax and exchange rate conditions.

1. Strategic situations of TNCs

There have been several outcomes of this period of turbulence. To begin with, the strategic strengths and weaknesses of the various TNC are now much more evident than they were. The global giants really amount at maximum to 8 producers; GM and Ford from the US, Nissan and Toyota in Japan, VW from the FRG, Renault and Peugeot from France, and Fiat from Italy. Within this set both Peugeot and Fiat must struggle hard to consolidate their position in the top rank. Chrysler and American Motors in the US are permanently under the searchlight for absorption (and indeed Renault already holds some 46% of the latter), and BL is under similar threat in the UK. The specialist European car producers are surviving and continuing to bring in sizeable profits, while the position of the second rank Japanese producers is not yet clear. Certainly the equity links which they have with US companies suggest that transnational joint ventures (JVs) are a distinct possibility (in this regard, the recent reports that Ford is considering activities in Mexico jointly with Toyo Kogyo, of which it holds 25% equity, are of interest).

These corporations exhibit marked differences with regard to their behaviour in foreign markets. The Japanese push, above all by Toyota and Nissan, has been through exports and has three principal dimensions: their dominance of market shares in many if not most developing countries' markets[10/]; their massive increase in the US market[11/]; and their strong advances in most of Europe, particularly FRG and the non-producing countries. The US giants, on the other hand, are groping towards a global production strategy which involves them not only in reorganization of investment in Europe and Latin America but also in a reconsideration of their approaches in Asia.

VW appears to have opted quite clearly for the selection of pivotal points in the world system. Drawing on its power in its home market and Brazil (where, in fact, production is on a par with that in FRG), it has grown in Mexico, invested substantially in the US, and within the past year has concluded important arrangements in Spain and China. Renault, the second major European producer, is also seeking pivotal areas but with less success; it continues to utilize its long-standing involvement in Spain, it is the only European producer which is in the process of taking over a US firm, and it did make serious attempts to break into the Indian market, though without success so far. These two European firms, as well as those in the next tier, are also engaged in substantial collaboration.

2. Towards new international norms: factory organization and supplier of systems

The internationalization dimension of the reorganization is one side of the coin. The other consists in the massive transformation of production and the establishment of new norms in process technology, consumption and corporate organization. Employment in the industry has been savagely reduced, its composition changed and the costs of remaining labour radically contained. Factory organization is undergoing a transformation which amounts to a revolution in an industry previously noted for slow evolution. Flexible manufacturing systems (FMS), robotization and the introduction of computer-aided design (CAD) and computer-aided manufacturing (CAM) systems are completely changing the face of the car factory. As this is done new relations inside the factory are being relentlessly moulded by management as it tries to introduce Japanese style quality circles and multiple task work by operators into the plant. Monitoring systems to control worker performance are becoming ever more sophisticated; the days of manual time and motion study are gone and have been replaced by computer control.

The shifts within the factory are accompanied by sweeping endeavours to alter the whole industrial system centered around auto production. The relations with suppliers are taking on a Japanese character as the major firms in both the US and Europe insist on new quality standards, the reduction of systems stocks, geographical locations of suppliers within a fixed radius of the vehicle producer, and single sourcing of major components. These alterations imply that not only the vehicle production side of the business but also the parts industry is going through huge investment and disinvestment. The idea is to create, within a remarkably confined time (most industry leaders outside Japan talk of 1985 as the deadline), a totally fresh industrial structure. That structure will be characterized by far less use of labour than was common even in the second half of the past decade, by the ability simultaneously to produce on a mass scale and yet give vehicles custom-made features, by the introduction of new materials, and by qualitatively critical shifts in the interindustry linkages emanating from the sector.

3. Government policies

It is in this setting that government policy must seek to understand and handle the global reorganization of an oligopoly. The issues involved include:

-the degree of direct and indirect cash support to be given to vehicle producers;

-the extent of back-up to be given for R and D in component sectors (above all electronics);

-the approach towards trade particularly LC and exports; and

-the question of whether any attempts should be made to struggle against the twin grips of denationalization and concentration.

These issues generate important questions for policy makers in all countries. The first concerns the likely structure of the oligopoly in the next few years. At the moment the signs are that it is becoming tighter on the global scale, with fewer firms and proportionately many more ties among them. These firms are conforming to new norms of production and consumption which involve sharp reductions in the numbers of models and parts, increasing interchangeability among those parts which remain, and much less dependence on unskilled and semi-skilled labour. The geographical operations of the TNC are, notwithstanding their global reach, focused on selected countries, each of which occupies a key role in the global system.

On the basis of that organization international trade, which is simultaneously both intra-firm and component in nature, takes place and it is that kind of trade which governments must handle. These structural shifts within and around the auto sector still leave open another question - i.e., to what extent will auto firms change their character? At least three aspects of this question are important: the degree to which corporations in other areas, particularly banks, might acquire equity interests in the sector; whether or not auto TNCs will try and diversify their production into other industrial and service sectors; and whether any of these firms will find that the geographical center of gravity of its operations has to be modified.

These remarks indicate both the characteristics which have persisted throughout the long life of the industry and those which are now undergoing irreversible change. The days when many could enter the industry were never many and are most unlikely to come again (which implies, among other things, that the chances for any developing country to build a national champion are extremely slim). Not only are the barriers to entry high, but the costs of staying in the game are also enormous, both for vehicle producers and component suppliers. The situation is one of high risk; but also of potentially immense profit for those who survive.

The position of the industry as a focal point in the industrial system has altered. No longer will it be a creator of jobs. It will be a pioneer in the introduction and use of technologies and materials of several kinds and in so doing will transform its inter-industry linkages. These changes are unlikely to be limited to the OECD countries, even though their present force is concentrated in that area. The fabric of the world system is now, therefore, one in which the conditions of crisis permit the oligopoly to strengthen its position at the expense of countries. Despite the mounting evidence that the industry cannot and will not be a source of major employment, governments continue to bargain against each other for the doubtful privilege of having an auto plant on their territory. It is a measure of the triumph of the oligopoly in crisis that it has managed to achieve this situation of power.

This chapter has presented the argument in terms of general observations and an effort to delineate the contours of change. The next chapter considers in much more detail the recent trends and their impacts both for individual country and for individual corporations.

CHAPTER II

RECENT TRENDS: THE RUPTURE OF STABLE GROWTH

A. Sales and Market Shares

1. Declining growth rates

Over the past twenty years there has been a marked decline in the growth rate of demand for cars. In Western Europe in the 1960s the growth was around 8% per annum on average: in the 1970s the figure had dropped to around 4.5%, and in the 1980s most estimates go no higher than 2%. Similar patterns are observed in North America - though in Japan growth rates, while lower than in the past, are still likely to be significantly above the other main OECD areas. This trend reflects a shift towards replacement markets, i.e., those in which new buyers represent only a small proportion of total purchases. Indeed OECD estimates suggest that around 85% of purchases in the region during the present decade will be of the replacement type. This fall in growth rates is now accompanied by sharp reductions in the number of vehicle models: in Western Europe in 1972 there were 50 models on the market, a decade later the figure had fallen to 34; and the estimates for 1992 run at around 25 i.e. only one-half of the figure in the early 1970s.

On a global scale the prospects are not significantly better since OECD sales alone represent some 82% of the global figure and therefore influence enormously the total growth calculations. The Commission of the EEC estimated that in the period 1975-1980 world growth was around 5.6% per annum and suggested that in the period 1980-1985 this figure would fall to around 3%. The figure suggests a significant degree of optimism with regard to developing country purchases. However, recent events, and in particular the collapse of markets in the largest developing countries, indicate that this optimism is by no means well-founded.

Moreover, the effective demand in those countries is almost certainly much less than is usually assumed: income distribution is highly regressive and the crisis has probably worsened that distribution. When we add to this the negative rates of growth of income per capita which now afflict the whole of

Latin America and most of Sub-Saharan Africa and Asia, then the likelihood of significant demand increase is small. Recently the OECD has in fact produced estimates appreciably lower than the ones cited above, and argued that the global figure in the 1980s and 1990s is unlikely to average much above 2%. Table 1 summarizes alternative forecasts of world demand up to 1990 and compares those with the situation as it existed at the beginning of the present decade.

For the US market auto producers retain some optimism, pointing in particular to the sharp rise in the average life of vehicles now on the road and to the bulge in the age population from 25 to 54. Indeed some industry commentators hint that vehicle production could jump from a total figure of around 8.5 million units in 1981 back to the record levels of around 12 million units achieved in 1978. All the same, even this optimism still contains a strong grain of uncertainty since no-one dares to indicate when this jump - if it is a jump instead of a gradual progression - will take place, nor to indicate what the size distribution of vehicles demanded will turn out to be.

2. Returns to investment and the struggle for market shares

The importance of these necessarily hazardous forecasts is nevertheless crucial. With the large-scale investments now on stream, there is a real possibility of significant over-capacity in the industry - this despite the fact that so many plants have been closed. It is true that the breakeven levels for US producers have been cut back by a big margin, from some 12 million units towards the end of the 1970s to around 9 million at the present time[1/], and that the improved handling of stocks makes the situation still more favourable. Even so, unless significant sales can be achieved by all producers then the struggle for market shares will be exacerbated still further and the pressures not only against completely built up (CBU) imports from Japan but also against those of components produced in Latin America will be much greater. The sales situation, therefore, points to a wholly different environment now from the one which existed only a decade ago. The consequences of this in conjunction with the other major factors mentioned do not augur well for developing country prospects.

Table 1

Alternative Forecasts of Automobile Demand[a/] in 1990

Forecaster	World Demand	Third World Defined[b/]	Third World Demand (%)	Date of Forecast
1979 situation	30.5	Latin America, Africa, Asia less Japan[c/]	3.7 (12.1)	-
Bhaskar	34-58	Other than North America, Western Europe and Japan	15-27	1980
Euro-Finance	43	Other than North America, Western Europe Japan and Oceania	10 (23.0)	1980
Sékaly	45	Countries with per capita GNP $2000 in 1981	7 (15.5)	1981
Economic Models Ltd.	37	Other than North America, Western Europe and Japan	7 (19.0)	1981
Toyota Motor Sales	41	Latin America, S.E. Asia, Middle East, Africa and Oceania[d/]	7 (17.0)	1981
OECD	38.1	Latin America, Africa, Asia less Japan[e/]	7.3 (19.2)	1983

Notes:

[a/] Figures are in millions of units.

[b/] The definitions are those employed in the studies concerned. The chief difficulties are the treatment of E. Europe (included by the definitions of Bhaskar, Euro-Finance and Economic Models); the treatment of Australia and New Zealand; and the fact that Japanese figures sometimes have to be subtracted out of Asia totals.

[c/] It is assumed that Japanese demand was around 3 mn. units.

[d/] These figures are based on a forecast for Japan of 4 mn. units.

[e/] Assuming Japanese demand of 4 mn. units.

Sources: Mitsubishi Research Unit, OECD Observer July 1983.

Within the OECD countries, market shares for domestic producers in the past couple of years have shown a range spreading from a mere 43% in the UK up to around almost 99% in Japan. In fact the six main OECD markets fall into three categories: the first includes, along with the UK, in France and Italy (where domestic producers occupy about 59% of sales); the second the US and FRG (around 73-75%); and the third is Japan. Looking at the position of domestic firms in relation to total sales in the home market, Fiat has the strongest position in its home base with some 45% of the market under its own mark and another 12% through Lancia. GM holds around 44% of the US market and that share has remained stable for several years. Toyota is the leader within Japan, around 40% of the market[2/], while Renault holds about 39% in France. In FRG the leading 30% share belongs to VW but in the UK the leading share belongs to Ford, at around 30%; as mentioned above, a considerable proportion of Ford's sales, however, are in fact imports from other European subsidiaries.

B. Production

1. Rankings of TNCs and countries

The production situation has changed even more sharply than sales. As noted in Chapter I, there has been a pronounced fall in the number of independent car producers still in the market - in Europe the number dropped from 36 in 1964 to only 18 in 1982. The ranking of producers has likewise been greatly modified as the Japanese firms have increased their scale of output enormously and a few of the European producers have lost ground. With the shifts among TNCs there have also been shifts among countries; these points can be made clearer by looking at a few of the figures.

In 1981 the major producer of passenger vehicles remained, as a decade earlier, GM with total production at approximately 5.5 million units, a figure slightly in excess of Ford and Toyota combined (the second and third ranked producers). Behind them came Nissan and VW, both just over the 2 million mark, then Renault and Peugeot around 1.6 million units each, and Fiat completing the list of those producers with an output greater than 1 million units. Further down the list two of the second rank Japanese firms, Honda and Toyo Kogyo, had production greater than that of BL which had been closer to the forefront in the early 1970s. Taken together the 8 largest producers in the world account for more than 70% of global output; although it is common to think of important vehicle producers as somewhat over 20 in number on a global basis, the reality is that less than half this figure are the ones who define the behaviour of the rest.

With the shift among TNCs, so the importance of countries has altered, both because of growth of national firms in their home bases and because of shifting patterns of foreign investment and foreign production. Thus in 1965 the leading world producer was overwhelmingly the US followed at a great distance by FRG, UK, France and Italy. At that time these were the only countries in the world with outputs on their territories in excess of 1 million passenger vehicles. A decade later in 1975 the pattern had altered tremendously. The US retained the leading position (but with a total reduced to 6.7 million units instead of the 9.3 in the mid-1960s), Japan then occupied second position with more than 4.5 million vehicles, FRG was third followed by Italy and the UK. By 1982 there were some further changes: Japan was now out-producing the US by nearly 2 million units, FRG, France and Italy remained in their respective positions, but Spain was by now approaching the 1 million mark as was Brazil and both of these countries had overtaken the UK. Indeed, that country's vehicle output is now only about half of what it was in 1965. Under the optimistic view that UK production will once more rise, recent predictions for 1988 suggest, that 8 countries will have annual production of 1 million units or more, and that Spain and Brazil will not be far behind Italy.

2. Internationalization

These shifts are themselves an important indicator of TNC influence. They both mark the countries where the struggle for survival of national leaders is acute as well as demonstrating how large-scale foreign investment within large protected domestic markets can put the auto industry in the forefront of production carried out on national territory. To investigate further the internationalization of production, Table 2 shows the comparative degree of foreign production in total output for 10 TNC in 1970 and 1980. The table has several striking features. First, the almost total absence of foreign production by the leading two Japanese TNC. That finding has been forcibly

Table 2 Foreign Production Shares

	1970				1980			
		('000)		(%)		('000)		(%)
	Domestic	Abroad	Total	Abroad	Domestic	Abroad	Total	Abroad
General Motors	2079	1455	4434	32.8	4065	1649	5714	28.9
Ford	2017	1689	3706	45.6	1307	1774	3081	57.6
Chrysler	1273	953	2226	42.8	639	135	774	17.4
Volkswagen	1835	238	2073	10.5	1517	771	2288	33.7
Renault[a]	946	117	1063	11.0	1492	573	2065	27.7
Peugeot[b]	504	22	526	4.2	1446	303	1749	17.3
Fiat[c]	1559	59	1618	3.6	1185	196	1381	14.2
B. Leyland	789	49	839	5.8	396	-	396	-
Toyota	1210		1210	-	2459	-	2459	-
Nissan	1057	-	1057	-	2143	51	2194	2.3

Notes:

a) includes American Motors

b) includes Citroën and Talbot in 1980.

c) excluding Seat, whose inclusion would raise the foreign shares to 17.9% in 1970 and 14.2% in 1980.

Sources: L'Argus, SMMT, MVMA.

confirmed by Bertrand[3/], who calculated ratios of national production to world output and production by national firms to world output, and found that, for 1980, the two ratios were identical for Japan and for Japanese firms; in both cases the figure was around 23.9%. However the same calculations showed that US production as a share of world output amounted to 21.7% whereas the share of US firms in the global total was around 33.4%. Thus the Japan figure reflects both the absence of foreign auto investment in that country and the absence of Japanese investment abroad, while the US data underline the critical role played by foreign investment of US based TNCs.

Second, the degree of internationalization is overwhelmingly greatest for Ford whose foreign production is now much ahead of its domestic output (a fact which has led some commentators to speculate, in very risky fashion, as to whether Ford is gradually ceasing to be a US company)[4/]. VW is next though quite some way behind. Thirdly, for both GM and Chrysler the foreign share was lower in 1980 than it had been a decade previously but the reasons for this differed totally between the two corporations. GM in 1980 was still in the initial phase of its current strategy which includes, among other objectives, that of overtaking Ford in foreign markets. To do this it is involved in major foreign investments whose results still need a year or two to show. Chrysler, on the other hand, was in 1980 in a desperate financial position which had forced it to sell off many of its foreign production facilities. Fourthly, among the other TNC the extent of foreign production is the greatest for Renault, due primarily to its activities in the US and Spain. Both Peugeot and Fiat are finding it progressively more difficult to sustain their foreign output and the chances are that current figures for both enterprises would be lower rather than higher than in 1980.

Since internationalization is precisely one of the critical areas of competitive struggle, the situation just described is in a state of flux. In particular the Japanese TNCs are rapidly laying the bases for international production, primarily in the US, secondarily in the weaker producing countries of Europe, and to a lesser extent attempting to break into the Latin American market. At the same time their production patterns in Asia are undergoing revision. Among the US firms GM has set itself a strategic objective of overtaking Ford in terms of external production. As regards the European TNC, their recent experience with production outside their home base has not been encouraging; yet VW and Renault, in particular, must carry through their external push if they are to remain sufficiently strong.

3. Vehicle size

The aggregate production data do not tell the full story because they fail to indicate just which producers are selling which kinds of vehicles. Aside from the obvious comment regarding the concentration of Japanese producers on cars of smaller engine capacity,[5/] it is important to emphasize that the US firms continue to operate with a stress on vehicle power considerably in excess of the average for other TNCs.[6/] One implication is that average prices for US vehicles are well above those for other producers; consequently a comparison in terms of value of sales rather than number of units produced would emphasize the US position. Suffice it to say that the aggregate sales of GM are now of the order of $70 billion, or substantially in excess of the national income of, say, Norway.[7/] It will be seen later that this difference in average engine size is closely related to consumption norms on the international scale and to the ways in which Japanese TNCs, in particular, may react to restrictions on their exports. As long as those barriers are formulated in terms of numbers of units sold, there is an incentive for those corporations to try and up-grade the size and thus the price of their exports. "The Japanese have raised the prices of the small cars they export to America, and replaced some of them with bigger, more profitable models."[8/] So far this strategy has not been pursued to a great extent but it is more than likely that Japanese corporations will go in that direction should trade restrictions persist.

4. Market segmentation and concentration levels

This production structure is still sufficiently segmented by market so that the concentration levels of production are high. Table 3 gives 1980 data for the leading OECD countries, the Latin American big 3, and India. In only one case (Mexico) does the share of the top 4 producers within the country fall much below 90%; for all the OECD countries listed the share of the leading three national producers is 77% or higher; and the concentration levels even for the leading two producers alone are generally above 65%. These data in some cases reflect the fact that there are only two or three firms producing on the national territory but in other instances, particularly for the developing countries cited, various other producers do exist but are really only of marginal importance.

Recent policy changes in some developing countries, e.g., Mexico and Philippines, in fact run in the direction of reducing the number of firms producing domestically. To the extent that these so-called rationalization schemes are pushed through, market concentration will increase still further. It is one of the ironies of the auto industry that developing countries should now be aiming at increasing the degree of oligopolistic control within their own markets rather than trying to strengthen domestic capabilities. The argument currently being advanced in these countries is that the expansion of capabilities is a function of a more "streamlined" structure - for that argument to have weight, however, it is essential that governments develop sufficient bargaining and monitoring strengths to ensure that the strictly limited number of producers actually yield spin-offs for the domestic economy. So far the evidence that they are doing so is remarkably hard to find. Consequently the pattern on a global basis for those countries where significant domestic production takes place serves to highlight the strong grip held, market by market, by the leading firms. It is within this kind of production framework that international trade should be considered.

C. Trade and Protection

The auto industry accounts for around 6.5% of world trade and some 12% of trade in manufactures. The intensity of trade grew very sharply in the period from the late 1950s onwards and in the past decade the role of trade has continued to assert itself. A comparison for 10 OECD countries of the ratio of imports to sales and that of exports to domestic production in the years 1973 and 1981 is revealing. For all 10 nations the import to sales ratio rose over the period while for 8 of the 10 there was similarly a rise in the share of exports to domestic production; even for those two countries where the latter ratio fell - i.e. FRG and Italy - the drop was only marginal.[9/] Consequently there is now a condition of progressive divorce between domestic output and domestic sales; from the trade angle, the industry is one of pronounced internationalization.

The chief exporters of finished cars, of which world trade is now around $60 billion per year, are Japan (30.6% of the global total) and FRG (22.8%). The US has become a major importer of complete vehicles, with its imports alone in 1981 equivalent to more than 30% of the global aggregate. As a proportion of national output Japanese sales are exceptionally high, being in excess of one-half. Yet the emphasis on countries fails to capture a critical fact, viz. that a high and rising proportion of this trade consists of intra-firm transactions. This share is likely to grow as the internationalization of production circuits expands. In this sense it is closely related to the growth of trade in components which is becoming of increasing significance.

The Commission of the EEC, noting "a growing tendency for assembly units to be located in the markets to be served", drew attention to "a corresponding increase in trade in components, equipment and technology to the detriment of trade in complete cars ... In 1979 spare parts accounted for more than 31% of Community automotive exports, compared with 23% in 1970 ... Japan, whose sales of spare parts will, according to certain estimates, account for 40% of automotive exports in 1985, compared with 20% at present".[10/] In similar fashion the ECE has noted that world exports of parts in 1980 were equivalent to more than half the sales of cars and has similarly emphasized the growing role of Japan in this trade, even though it is at present well below FRG, US, France and UK. The world market for auto parts in fact rose by 121% in the period 1975-1979, with the US share falling (yet still remaining very important). Consequently the developing country involvement in parts trade, which is increasingly becoming the area of greatest interest to them, is now likewise the battleground for further struggles among the leading car producing nations.

The regional pattern of international trade continues to be pronounced despite the international growth of the industry. The main circuits of trade continue, with Japanese exports on a global scale but those of other leading producers confined chiefly to specific regions. E.g., the US producers are involved in intra trade with the accent on exchanges between the US and a handful of countries in Latin America, and the European firms continue with trade inside the continent as well as Latin America and some exports to Asia and Africa. There seems little indication that these compartmentalized flows are likely to change much in the next few years; and, as will be seen later, the efforts at global integration especially by GM and Ford do not really indicate that they are likely to begin exchanges that go way beyond the regional pattern. Consequently, the efforts of governments to attain greater local shares of production, and in particular greater LC, usually involve dealings with a handful of countries and only affect trade between them. Although there is a real conflict between endeavours to strengthen LC and the transnationalization process, the likelihood is that most disputes will be of a localized nature even though, of course, many such disputes may be going on at any one time.

The major struggle now in progress regarding fresh trade patterns among OECD countries relates to 'captive imports' into the US. GM has, within the past year or so, taken two major initiatives to strengthen its involvement in the small car market in the US via collaborative arrangements with Japanese firms. At one level is its joint venture (JV) with Toyota to assemble 200,000 Japanese designed cars at Fremont, California. Production from this plant will, provided authorization is received from the Federal Government, come onstream in 1985.

At the second level GM has concluded arrangements with Suzuki and Isuzu (in both of which it has equity holdings) to import annually around 300,000 subcompact cars which would be sold under the GM name plate. In total, therefore, these arrangements, when fully operative, would give GM a direct involvement in the annual sale of approximately half a million small cars in the US. The issue is significantly complicated by the fact that GM is lobbying for the 300,000 imports not to be included as part of the Japanese voluntary export restriction (VER). That has held Japanese sales to 1.68 million units over the last three years, with a recent agreement pushing the limit to 1.85 for the period 1984-85. Since, under present arrangements, the Isuzu part of the total VER is a mere 16,000 units and Suzuki has no allowance at all, acceptance of the GM requirement would push effective total imports beyond the two million mark.

Under these circumstances it is no surprise that Ford, Chrysler and American Motors are strongly opposing the GM position. Moreover, the United Auto Workers Union (UAW) has pointed out that the major concessions yielded in the March 1982 approved contract were not given with this in mind. As the UAW President has remarked, the Union "did not go to the bargaining table to give GM relief so they could go out and have a joint venture with Toyota or import Japanese cars ..... we gave it to them so that they could go out and develop their own small car."[11]

Table 3

Concentration levels of production in Major Producing Countries,[a/] [b/], 1980

(Percentages)

Country	Passenger cars			Commercial Vehicles			Total		
	Top 2	Top 3	Top 4	Top 2	Top 3	Top 4	Top 2	Top 3	Top 4
United States	84.4	94.3	97.4	78.3	85.7	90.2	83.1	92.6	94.7
Japan	65.4	77.4	87.9	57.9	69.0	78.6	62.7	72.8	82.8
Germany, Fed. Rep. of	65.4	77.9	89.8	84.7	91.6	97.3	62.5	78.7	89.5
France	100.0	100.0	100.0	95.9	100.0	100.0	99.5	100.0	100.0
United Kingdom	80.0	93.5	99.5	68.9	93.7	97.8	76.7	88.2	99.0
Italy	97.2	100.0	100.0	99.7	100.0	100.0	97.5	99.9	100.0
Sweden	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Spain	58.1	82.1	100.0	58.1	78.3	91.7	54.3	76.8	93.8
Brazil[b/]	71.6	86.6	99.5	57.0	78.1	88.0	65.2	79.4	93.6
Mexico	56.1	68.5	75.6	52.7	64.4	76.1	47.7	65.4	73.4
Argentina	59.4	75.1	87.9	80.4	86.4	91.1	63.5	84.2	95.4
India	100.0	100.0	100.0	61.0	76.6	88.4	51.5	68.2	79.6

Source: Calculated from Automobile International, op.cit.

a/ Defined as the share of leading firms in the country's total production of vehicles.

b/ Chrysler Brazil is included under VW (FRG).

The developing country share of world trade remains minimal. Table 4 shows the destination of auto exports of developing countries for 1978 and this table underlines the limited number of developing countries who are really in the market at the present time. By far the most important trade is from Brazil, Mexico and Yugoslavia, with the two former countries concentrating their exports strongly towards North America and the rest of Latin America. These trends are likely to be accentuated in the remainder of the decade. As can be seen in the table, a good proportion of this trade is now in components, and that share too will rise in the next few years. In any event, the trade is chiefly intra-firm in nature and once more the investment plans and requirements of the companies themselves suggest that this element will grow.

It is worth stressing that the export push which has been at the core of the 1970s policies of the three Latin American countries shown in the table has itself led to a canalization of parts trade through the vehicle producers. In his survey of the experience of these three nations Lifschitz has commented as follows: "For the most part, the external sales of these countries are accounted for by automobile parts. During the decade of the seventies they represented, on average, 70% in Argentina and Brazil and 80% in Mexico. The exporting firms are now the producers of those parts. On the contrary, save for certain exceptions, these are handled by the terminal firms."[12/]

The foreign exchange stranglehold, which has been a permanent fact of life for many developing countries and is now the case for almost all of them save a few of the Arab petroleum producers, has inevitably begun to affect trade relations. This can be seen in the appearance of various cases of barter trade. For example, in 1982 Jamaica concluded two arrangements, one with Chrysler and the other with GM, involving the exchange of aluminium for vehicles. Given that there is increasing use of aluminium (as a substitute for steel) in car production, the deals would seem to make sense, though of course the critical issue is the terms under which such barter takes place. Algeria has similarly conducted deals with Honda involving the exchange of oil for vehicles; once again the terms of this exchange have not been divulged. The extent to which barter trade may expand depends above all on those developing countries who have the kinds of raw and semi-processed materials

Table 4

Destination of automotive exports[a/] by major developing countries, 1978

(Percentage)

Country	Item	Total Value ($m.)	Destination (%)					
			Developed			Developing		
			North America	Europe	Other[b/]	South America	Africa	Asia
Brazil	Total	551.6	13.7	7.0	0.3	41.2	34.2	3.6
	Cars	183.3	-	2.8	-	36.7	52.5	8.0
	CVs	225.0	13.1	5.8	0.5	48.2	31.5	0.9
	Parts	143.1	32.1	14.1	0.4	35.6	15.3	2.4
Argentina	Total	146.0	4.0	8.4	-	86.2	0.7	0.7
	Cars	35.0	2.6	1.4	-	96.0	-	-
	CVs	42.6	-	-	-	97.9	2.1	-
	Parts	68.1	7.2	17.3	-	73.9	0.1	1.3
Mexico	Total	256.2	47.6	30.7	1.3	19.6	0.1	0.7
	Cars	63.7	0.8	97.0	-	1.9	0.2	0.2
	CVs	44.5	23.8	0.2	-	75.7	-	0.2
	Parts	147.4	74.9	11.3	2.2	10.4	0.1	1.0
Yugoslavia	Total	246.3	1.1	76.7	-	0.9	18.1	3.2
	Cars	43.6	-	83.0	-	3.6	13.5	-
	CVs	83.1	0.1	50.4	-	0.6	40.6	8.3
	Parts	114.6	0.1	95.0	-	0.2	3.7	0.8
India	Total	100.8	1.4	5.4	1.1	0.1	25.1	66.9
	Cars	0.9	-	11.1	-	-	22.2	55.6
	CVs	29.2	-	-	-	-	43.5	56.2
	Parts	64.0	1.9	7.6	1.7	0.1	18.9	70.0
Korea, Rep. of	Total	79.4	1.8	15.7	4.9	24.6	20.0	33.0
	Cars	42.3	0.2	18.0	0.5	22.9	26.7	31.7
	CVs	26.3	0.7	17.1	0.4	33.1	14.1	34.6
	Parts	8.0	13.8	5.0	11.3	12.5	11.3	46.1

Source: U.N. Bulletin of Statistics on World Trade in Engineering Products, 1978 and 1979.

Note: Due to rounding of percentage figures the percentages do not always sum to 100 percent.

a/ Totals include motorcyles.

b/ Oceania and Japan. CMEA countries not included here.

which car producers are looking for - the two examples of aluminium and oil are obvious ones and certainly both of these commodities could be traded by other developing countries. Unfortunately the list is not that long and with the rapid reorganization of production systems and in particular the increasing use of inputs which depend on substantial technological effort the chances are that developing countries will not find it so easy to conclude the barter deals.

It is possible that off-shore production of micro-electronics by car producers could generate this type of trade; yet even there the prospects seem limited and that for two reasons. First, barter trade works best when there is government involvement (that has been the case in the Jamaican and Algerian examples) and electronics firms are mostly in private hands. Secondly, the degree of this kind of off-shore production which is under the control of vehicle producers themselves is minimal. Consequently the barter would need to go through at least triangular arrangements and at that point becomes much more complicated.

Various references have been made so far to the growth of LC, export requirements and other forms of explicit action by governments in relation to auto trade. Table 5 presents a summary of automotive trade restrictions in force in a fairly large sample of both OECD and developing countries, and shows also whether or not Japanese and US producers have any kinds of operations in those countries. Looking at the developing country part of the table, the striking feature is that import restrictions are in force practically everywhere and that, as may be expected, the LC and export requirements show up strongest in those countries where the operations of foreign producers are substantial. The table is drawn from a study by the UAW of the US - a fact that, in itself, is revealing.

Over the past 18 months the pressures for some kind of restrictions, especially regarding LC, to be introduced in the US in addition to VER have grown substantially. They come from labour which has been by far the hardest hit group by the crisis. At the present time the LC of the leading US producers in their domestic operations is in fact very high. Thus "the fact remains that Ford Motor (US) sources 94% by value of its components for cars within the US... Chrysler (US) is estimated to rely on non US sources for 5% of its car components by value, with Japan, Mexico and FRG among the main

Table 5 Survey of Automotive Trade Restrictions Maintained by Selected Nations*

Summary of Foreign Automobile Trade Restrictions 1/

Country	Local Content Requirements	Import Restrictions	Export Requirements 2/	Operations	
				Japanese	United States
Algeria	no	yes	no		
Argentina	yes	yes	yes	yes	yes
Australia	yes	yes	no	yes	yes
Austria	no	yes	no		yes
Belgium	no	yes	no		yes
Bolivia	yes	yes	no		
Brazil	yes	yes	yes	yes	yes
Chile	yes	yes	yes		yes
Colombia	yes	yes	yes		yes
Denmark	no	no	no		
Ecuador	no	yes	no		yes
Egypt	yes	yes	no		
France	no	yes	no		
Germany	no	no	no		yes
Ghana	no	yes	no		yes
Greece	yes	yes	no	yes	
India	yes	yes	no		
Indonesia	yes	yes	no	yes	yes
Israel	no	yes	no		yes
Italy	no	yes	no		
Japan	no	no	no		yes
Kenya	no	yes	yes	yes	yes
Kuwait	no	no	no		
Malaysia	yes	yes	NA		
Mexico	yes	yes	yes	yes	yes
Morocco	yes	yes	no		yes
Netherlands	no	no	no		yes
New Zealand	no	yes	no	yes	yes
Nigeria	yes	yes	no		
Norway	no	yes	no		
Pakistan	yes	yes	yes		yes
Peru	yes	yes	no	yes	yes
Philippines	yes	yes	yes	yes	yes
Portugal	yes	yes	no	yes	yes
Saudi Arabia	no	no	no		
Singapore	no	yes	no	yes	yes
South Africa	yes	yes	no	yes	yes
South Korea	yes	yes	yes		
Spain	yes	yes	no		
Sweden	no	no	no		
Switzerland	no	no	no		
Taiwan	yes	yes	no		
Tanzania	no	yes	no		
Thailand	yes	yes	no	yes	yes
Turkey	yes	yes	yes		yes
United Kingdom	no	yes	no		yes
Uruguay	yes	yes	yes		yes
Venezuela	yes	yes	yes	yes	yes
Yugoslavia	yes	yes	no		

* (Compiled by the Office of International Sectoral Policy, U.S. Department of Commerce from information supplied by U.S. Embassies, commerce country analysts, and industry sources. The accuracy of the information received has not been verified.)

1/ The measures cited in this chart are for new cars. Trade restrictions on used cars are not reflected.

2/ Import restrictions apply to non-tariff measures maintained by a country which deals solely with imports. Tax measures which apply to both imports and domestically produced products are not included.

sources of its non US components. Foreign owned firms tend to use a significantly smaller percentage of US components, taking advantage of their expertise and capacity in Europe. VW, for example, imports around 30% of the value of the components for the cars it produces in the US, with FRG, Brazil and Mexico the primary sources."13/

The point is, however, that their foreign sourcing plans (to be discussed later in this report) suggest that proportion could fall in the next two or three years. If this did happen, and if high LC requirements (say 90%) were to be enforced, then the LC requirements in the US would run into conflict with the situation of Brazil and Mexico where, although some trade off in LC is permitted in return for additional exports, the figures would still leave the TNCs with little room for manoeuvre.14/

The table further demonstrates one of the arguments advanced in Chapter I: i.e., that at the present time the policy combinations which are being employed in OECD countries are no different from those in the major developing country locations. The problems are of a similar kind in both groups, even though the history - and - the bargaining power (though not always to the detriment of the DC) - is different. The point is that the table dramatizes the growing conflict between the transnationalization process and the desire of many countries to retain on their territory what they see as a key dimension of their industrial structures. Though the auto industry is going through a sea-change, government attitudes to it are altering much more slowly, at least in the non-core countries. It is this fact which allows the TNC to shop around so effectively for the best deals and in particular to receive such substantial subsidies from governments.

By the same argument, however, once a TNC is established in a country, then it is to some extent a hostage to fortune (the shorter the payback period, the less of a hostage it is). From the TNC angle the prevalence of the requirements shown in Table 5 and the fact that they are apparently on the increase represents one of the major uncertainties confronting them in their decisions regarding further transnationalization. Lest it should be considered that this restriction is too severe, it is worth stressing here that the history of the application of LC requirements (especially in the DC) is replete with retractions by governments and bowing to pressure from the TNC. This point is discussed in more detail in a later chapter.

Within OECD countries the thrust of most actions in the present decade has been at exports by Japanese producers; the most common instrument for limiting these exports has been VER[15/], mentioned briefly above. For the past three years the number of units which can be exported to the US has been limited through this device and similar actions have occurred from some of the EEC countries, Canada and Australia. In the case of the US producer firms, the advantage of VER is that they give more breathing space while industrial reorganization is going on - that breathing space is for the TNC and not for labour, since jobs have already been cut back dramatically and irrevocably. For the EEC producers the matter is not so straight forward, since there is evidence that Japanese firms have been able to shift exports from one market to another.

In other words, the existence of VER in several locations does not necessarily mean that total exports from Japan have been held back to a significant extent. But in the EEC case other devices also are used. The best known example is Italy where, curiously enough, it was the Japanese themselves who, on joining GATT in 1955, asked Italy to limit vehicle trade in both directions to 2,200 units per annum to which the Italian government agreed - and has gone on doing so ever since. In France also direct pressure has been put on Japanese producers not to push their market share beyond 3%. This measure has not meant that the French market has been able to control overall imports since in fact they recently reached record levels; what has happened is that the sources of the imports are mainly FRG and one or two other European locations rather than Japan.

There are several ways in which Japanese producers can and have reacted to these pressures. The first is, through switching the destinations of their exports, a strategy which up till now has been quite successful. Second, through up-grading the quality of exports and thus the price. This is possible because the restrictions relate to the number of units sold rather than the value of sales. A third possibility, less extensively employed so far but certainly a future option, is the development of what might be called surrogate export locations - i.e., places where Japanese firms are heavily employed in production but where the exports could be regarded as coming from the country concerned rather than Japan itself. Perhaps the leading possibility so far is the Province of Taiwan, where since 1982 a JV has been under discussion between the government and Toyota with one of the conditions being that around half of the output should be exported. The point to be made here is that this condition is probably at least as attractive to the TNC as to the Taiwan province. Whether or not surrogate exporting could develop on the scale which it did in the textile industry is a separate question. The structure of the auto business, however, argues strongly against such a development acquiring anything like the proportions found in other sectors.

Throughout the debates on trade it is essential never to lose sight of one basic fact: i.e., the development of trade has, throughout the history of the auto industry, been very heavily controlled by the two US giants. The disruption of the Japanese sales in the past few years has been the first real challenge to that control. Yet the significance of that challenge has been confined mainly to the growth of imports in the US market itself. Even there it is striking that GM still retains around a 44% share of the market and that proportion has not varied much in recent years. All the other dimensions of international trade are evolving in a reasonable fashion as far as the US giants are concerned. Their grip in Europe has strengthened rather than weakened and indeed their European subsidiaries have been and continue to be major beneficiaries of the restrictions on Japanese imports there. In developing countries the absence of direct investment by Japanese producers in the leading Latin American countries has meant that the US grip has only been challenged in a significant way by VW and, to a much lesser extent, Renault. The main preoccupation is perhaps Asia; but there the US firms are gradually improving their position through second-rank Japanese firms in which they have shareholdings.

The segmentation of world trade, and indeed many of the so-called barriers introduced in particular countries, in reality fits quite well with the global strategies of the US firms. For them the crucial option is to have established themselves in the investment locations which they regard as optimal and, building on those locations, to be able to create the closed circuits of trade which meet corporate strategies. Indeed there is some evidence that GM and Ford continue to regard each other as the major rivals more than the Japanese firms. This is particularly true in external operations (internally GM is well ahead and probably unchallengeable) and has led one commentator to remark: "GM has decided as a matter of policy to try and overtake Ford outside the US, where it comes a poor second, and the rivalry between the two US majors may prove to be the most worrying development for the European producers."[16/]

In summary, therefore, the developments in trade cannot be viewed outside the fundamental processes of industrial reorganization and transnationalization. In those processes the dominant entities continue to be the leading US producers and it is their grip in Europe and Latin America which allows them to influence so strongly the trade patterns. The policies introduced in many countries, both in their formal terms and their actual application, are never free from the strong influence of these firms. In short, it is a mistake to talk of them as government policies since in reality they cannot be divorced from the strategic objectives of a handful of TNC. As one GM official in Venezuela put it: "At GM the trend is away from studying macro-political stability to studying a country's regulatory process and its likely choices. In our business we can face major problems from changes in such things as LC laws[17/]".

D. Employment

The single most striking fact about the auto industry in the past five years has been the enormous drop in employment in all countries except Japan and, to a very limited extent, the Iberian Peninsula. In the US, of the order of 220,000 auto workers are on indefinite lay-off and the UAW has estimated that at least 150,000 of them will never again work for a motor company[18/]. In the European context a 1981 study by Ford itself estimated that some 360,000 auto jobs would be lost in the period 1981-85 and that two-thirds of these losses would be concentrated in FRG, France and Belgium. Job reductions in the UK have already occurred on a large-scale and here, as elsewhere, the losses are not conjunctural but structural[19/].

From 1978 to 1981 the labour force directly employed by GM dropped by approximately 100,000, the same was true of Ford, and both Renault and Fiat registered reductions of the order of 10-12,000. Within the developing countries the bite has come in the past 18 months: in Mexico it was estimated that 60,000 of the 200,000 workers in the auto industry lost their jobs in the last eight months of 1982 while VW, GM and Ford dropped their employment in Brazil by 15,000 in 1981. Summary data of world-wide employment changes in leading TNCs are presented in Table 6.

Table 6

Worldwide Employment[a] Changes in Leading Automotive TNCs, 1978-82[b]

Corporation	1978	1982	% Change
GM	839	657	-21.7
Ford	506	404[c]	-20.2
VW	207	239	15.5
Renault	143[d]	132[d]	- 6.7
PSA	265[e]	208	-21.5
Fiat	134	124[c]	- 7.5
Toyota	45[f]	56[f]	24.4
Nissan	56[g]	59[g]	5.4

Notes:

a/	Figures in units of thousands.
b/	Data for year end except where otherwise specified.
c/	1981.
d/	Data for vehicle production and not the whole Renault group (end 1982 employment for the total group approximately 217,000).
e/	1979 figure, to include Citroen and Talbot.
f/	Figures for June 1978 to June 1982.
g/	Figures for March 1979 to March 1983.

Due to substantial differences in company structures and definitions, no comparisons among companies should be made.

Sources: Company data; personal files.

These figures, dramatic though they are, give only part of the employment story. Within the US there is a strong shift towards regions of the country in which the rate of unionization of the labour force is lower and thus where wage costs are below those elsewhere[20/]. The shift of employment towards the south-east of the country is much more apparent for the parts industry than for vehicle production itself; but in general the move is towards setting up the new plants in areas where industrial history is scant. Put another way, this means that the move is away from the more militant centres of trade union activity.

Moreover, there appear to be growing ethnic considerations in the choice of location: e.g,. when VW was setting up its operations in the late seventies it went for places where the workforce was predominantly white and of east European stock. Japanese investment in California now appears to be directed towards areas where there are significant numbers of Japanese Americans, and the Nissan truck plant in Tennessee has, apart from a high proportion of Japanese employees, about 14% Mexican labour. The industry is therefore on the move within the US and that move corresponds, among other things, to the hunt for less unionized areas and less militant working groups.

In the European context the past three or four years have also been momentous. A turning point in Italy was certainly the defeat by Fiat of the major strike in its Turin base in 1980; since that time the labour movement has been much quieter. In the UK corporate control over labour actions has increased substantially; while one or two plants remain highly conflictive, the overall impression is one of labour on the retreat. The most recent evidence of fierce struggle in fact comes from France where the migrant labour working in Renault and Peugeot factories has been prominent in some protracted disputes. In FRG this has been much less noticeable, but one of the reasons for that is the refusal of the government to continue to grant work permits to these employees. That fact alone is an indicator that employment statistics may well understate the degree of job loss since part of the labour force in Europe has in fact been removed from the countries.

The composition of the labour force in skill terms has altered considerably in most major firms. This is a concomitant of the changes in the production process. As unskilled and semi-skilled labour is expunged from the system, jobs are increasingly filled by technicians capable of handling the computerized systems. This in itself contributes to a weakening of union militancy since these groups are much less likely to be involved in important disputes. Indeed, the elimination of human handling of several noxious tasks and the growing prospects for robotization of assembly activities simply adds to the chances of industrial calm. These considerations have entered the explicit requirements of the TNC in their foreign investment deals. Ford, for instance, has insisted in its negotiations in Portugal that there be guarantees of social peace from the government and communist unions.

The reductions of employment have, not surprisingly, been accompanied by sharp changes in the content of labour contracts. It is estimated that the leading three US producers have obtained concessions from the UAW equivalent to around $4 billion in the current contract period. These concessions comprise not only foregone wage rises but - and this is perhaps more important to the firms - changes in the method of payment as (with basic wages comprising a smaller proportion of possible worker receipts), alterations in work practices designed to eliminate demarcation lines among tasks, and a readiness of the labour force to countenance early retirement schemes and other methods of ensuring that it only contains those who, from the corporate angle, represent the fittest. In the European context Ford is repeating the pattern, although it is having less success in the UK than elsewhere. However, a clear sign of the confidence with which the company views its position is the recent comment by Ford staff to the effect that it is the workers who will decide whether the important Halewood plant continues to operate or not.

All of these changes in the situation of labour cannot be separated from the patterns of investment which are now sweeping through the industry. These, therefore, form the subject of the next section.

E. Investment and Disinvestment

1. Outlays and aims

The scale of current investment programmes in the auto industry is unprecedented. It is universal, in that all TNCs are engaged in massive transformation schemes; much of the investment is concentrated in the home countries of the TNCs or in their main foreign production bases; the purpose of most of the investment is retooling and automation; and it is accompanied by important disinvestment, chiefly through plant closures, in most of the countries concerned. An impression of the size of the investments can be gleaned from Table 7 and the following figures. The US producers have investment programmes variously estimated at from $70-80 billion for the period of the late seventies up to 1985. GM alone has a five-year investment plan terminating in the latter date to the value of some $40 billion which exceeds the sum spent on capital projects in the 15 years up to 1980. Of that total, around 20% is projected for areas outside the US (with about 15% of aggregate investment in Europe). Ford has a programme which is similar in structure but on a smaller scale. The Japanese producers, notwithstanding their export success, are acutely aware of the ferocity of the struggle for market shares and are therefore intensifying their investment programmes. "Between 1974 and 1977, the proportion of value added earmarked for investment by the three main Japanese manufacturers was 35% on average, compared with only around 18% for the ten main European companies and barely 14% for the four main American groups. The MITI recently said that Japanese manufacturers are going to make $12 billion worth of investment in Japan over the next three years in order to replace models and productive equipment[21/]." For the period 1982-84 Toyota is spending approximately $1.5 billion per annum on new plant and equipment which it considers will be some three times as effective as GM expenditures in boosting productivity. Among the European producers, VW has an investment programme running at DM 13 billion in the three-year period 1981-83 - though in its case the proportion going to FRG, some DM 2.5 billion, is considerably lower than most other companies as far as their home base is concerned.

These outlays correspond to strategic aims of the TNCs in reinforcing their positions on a global basis. A good example is given by Ford which has a current ten-year business plan that is christened 'After Japan'. This plan focuses to a considerable extent on Europe where, as can be gauged from the statistics on foreign production of the company given earlier, a critical element of the company's future is at stake. The principal aspects of the plan can be described as follows. The target numbers are a return on sales of at least 5%, a return on assets of not less than 10%, break-even at around 60% and an on-going market share for the whole of western Europe of 14% for cars

Table 7

Realised Domestic Capital Investments

by US 'Big 3' Automotive Producers, 1970-82

Period	Total	of which (%):	GM	Ford	Chrysler
1970-77	$ 32.6		57.0	30.6	12.4
1978-82	$ 50.6		66.5	27.6	5.9

Note: Figures in billions of current US$. Figures do not give the full total of expenditures in US since AMC and VW are excluded.

Source: US Department of Commerce.

and 16% for trucks. On a global basis, this translates to a return on assets of some 9% and profits on European automotive operations of at least 2%. The company hopes that its activity in the parts business within the US will provide a major support to these kinds of objectives and aims there at a minimum return on assets allocated to parts production of 28%, an average return on parts sales of at least 11%, and domestic parts revenue by 1990 of around $1.8 billion (measured at 1980 prices).

2. Costs and credit ratings

The costs of these investments have shown up in no uncertain fashion in the financial statements of the various corporations. In fact there has been a complete switch in the degree of financial self-sufficiency of the companies. In the period 1970-1977 US manufacturers had an average self-sufficiency ratio of about 1.7, while the European firms, over the period 1974-1977, averaged around 1.1; at the beginning of the decade Japanese companies were still relying on external financing, though in their case part of that comes from banks which are associated with them via the industrial and conglomerate groups.

By the 1980s the position had changed dramatically. Whereas in 1978 the four US companies (including American Motors) had working capital on hand for reinvestment purposes of approximately $13 billion, by October 1981 the figure was down to $0.3 billion. These firms were compelled to go to the money market to raise capital for their investments: "In the past, American motor companies financed their investment spending through retained earnings and depreciation but in the late 1970s they were obliged to raise their long-term debt to equity ratios rapidly, despite sales of overseas assets. The triple A credit rating in the public debt market, which the large motor corporations once held as a matter of course, has now been withdrawn from even GM[22/]". The Japanese firms, on the other hand, have been able to finance their investments whilst keeping their debt position under firm control; in fact long-term debt to equity for Toyota is now on a 1:1 basis. Consequently there has been a dramatic reversal of the financial strength of the companies: it is said that the Japanese position is so strong on the financial front that the firms even have capital available for diversification.

3. Disinvestment and diversification

These major investments are taking place simultaneously with substantial plant closures; Table 8 gives an idea of their magnitude in the US for the period 1980-1982. Those figures relate to the US companies in their home market and this is certainly the largest degree of capacity elimination. As noted earlier, Chrysler has reduced its activities outside the US; but in most cases those plants have been taken over by other manufacturers. Within Europe, plant closures have been concentrated mainly in UK and Italy, though there have been some reductions also in FRG and in France. In certain cases, of which the former Briggs Bodies (Dagenham) plant of Ford in UK is perhaps the leading example, older plants have been transformed into new production units; but these instances are very much the exception rather than the rule. What this means, as suggested earlier, is that the geographical centres of gravity of the industry within its traditional countries are altering, the emphasis being on the move towards so-called greenfield production sites.

Some of the investment has been aimed at diversification but the experience so far has not been favourable. VW ran into severe problems with its purchase, for more than $0.4 billion, of the office equipment producer Triumph-Adler. This attempt to move into a fresh area of activity brought many more problems than profits and within a short time after acquisition the company was trying hard to divest itself of its new entity. The case is interesting because the difficulties of Triumph-Adler were closely related to its over-emphasis on electromechanical equipment rather than electronics production. In view of the links which VW possesses with Robert Bosch, one of the world's leading producers of electrical and electronic equipment, it is surprising that the company should have miscalculated the real technological assets of Triumph-Adler. It happens that this was not the only acquisition problem for VW, since its moves into the US market have also run into severe obstacles and the company has now sold to Chrysler its never used second production plant (it was 80% complete) on which major outlays of more than $130 million had been made.

Table 8 Automotive Plants Closed, 1980-81 and Announced Closings, 1982

	Jobs Lost
CHRYSLER	
Hamtramck, Michigan	3,600
Lynch Road, Detroit	5,000
Missouri Truck, St. Louis, Missouri	4,100
Warren, Michigan, Recreational Vehicles	2,000
Mack Avenue Stamping, Detroit	4,100
Eight Mile-Outer Drive Stamping, Detroit	2,400
Windsor Engine, Ontario	2,400
Detroit Universal, Detroit	1,100
Lyons Trim, Michigan	700
Scio Electronics, Michigan	600
Cape Canaveral Electronics, Florida	500
Michigan City Plastics, Indiana	300
Huber Avenue, Detroit	2,400
Fostoria Iron, Ohio	650
FORD	
Mahwah, New Jersey	4,800
Los Angeles, California	2,300
Northville Vavle, Michigan	200
Flat Rock, Michigan	5,000
Windsor, Ontario	1,600
Aluminum Casting, Sheffield, Alabama	1,100
Cleveland Auto Parts Depot, Ohio	65
Richmond Tractor Parts Depot, Virginia	19
Boston Auto Parts Depot, Massachusetts	40
GM (Announced closings since January 28, 1982)	
Fort Street Trim, Detroit	2,980
Milwaukee Avenue Die, Detroit	255
Coit Road Stamping, Cleveland	2,770
Hardware Parts Plant, Trenton, New Jersey	3,615
Automotive Trim, Euclid, Ohio	1,115
Fremont, California	2,500
Southgate, California	2,550
Auto-Related Plants	
Several hundred auto dependent plants have closed since 1978.	

4. Foreign investment and government subsidies

Despite the strong concentration of investment on traditional locations, the present period has also seen attempts to establish new plants in other countries. These international investments have always been a matter of negotiation with governments and competitive bidding among the latter to attract TNC investment has been substantial. This bidding has reached levels which seem little short of astonishing given the grave unemployment everywhere, and consequently the need for careful allocation of public investment funds. Ford's activities in southern and central Europe are a case in point.

The company began its moves a decade ago in Spain and at that time calculated that the labour costs in Valencia would be some 40% below the Belgian alternative (Saarlouis) as far as direct inputs were concerned and that hourly indirect labour in Valencia would cost only about 53% of the Saarlouis figure. But just as important as these labour calculations was the fact that the actual foreign exchange which would have to be brought in was only about 10% of the value of the investment, with the rest available through borrowing on the Spanish money market. Moreover, as the plant was to be export-oriented the Spanish government gave a subsidy of 13% of the value of exports shipped from the country. Much more recently the same company has been engaged in protracted negotiations with the Portuguese government over an investment there estimated to be of the order of $1 billion; various calculations suggest that Portuguese sources, and in particular government subsidies, would furnish around one half of the total - a remarkable subsidy on any scale.

GM has similarly been in the forefront with its negotiations in Spain and in Austria for the establishment of new plants there. In fact the Spanish factory is producing the new Corsa while the Austrian plant located near Vienna is a centre for engine and gearbox production which is then exported, primarily to Spain. In effect the company was engaged in twin and simultaneous investment choices which allowed it to play-off one country against the other with net results of substantial subsidies from both. Austria is covering GM's costs of investment to the tune of some 30%, with the funds coming both from the Federal budget as well as the City of Vienna. In the Spanish case the government has made major investments in infrastructure, has explicity reduced its LC requirements, and has extended its export subsidies - a package which makes that country a very convenient location.[23/]

These examples serve to illustrate that the figures for corporate investment are in reality figures which cover indirect investments from the public purse in several countries. The leverage held by the TNC, above all the two US leaders, is so substantial that, in most instances, they can safely reckon that for every $2 coming from them there will be $1 coming from the countries where they choose to go. Under these circumstances the costs of reorganization are being met to a substantial extent by governments rather than corporations. This point is underlined if we take into account one or two other features of public support practices. The Commission of the EEC has calculated that, within the Community, the regional and social funds make,in fact, an important contribution to the industry: "more than 5% of investment in the car industry over the last few years has been financed out of Community funds[24/]." In the R and D field it is estimated that the US government finances some 11% of all expenditures by motor manufacturers with rather lower percentages predominating in the European countries. Moreover, the significant support now being given by national governments to developments in the electronics industry certainly constitutes an indirect back-up to auto producers. One way or another, therefore, the investment programmes are huge; but they are also financed by countries as well as corporations.

In view of the large-scale loss of employment which has taken place in the same period as these investment programmes have been put into operation, it would be surprising if there had been no calls by organized labour for some form of co-ordinated approach to the investment question. To quote the European Commission again: "The European Metal Workers' Federation would like an investment notification scheme to be set up at national and community level and public subsidies to the auto industry to be harmonized on a community scale ... the Commission could set up the machinery for monitoring the aid granted to the auto industry[25/]." In 1982 at a meeting in Tokyo of international union groups concerned with the industry there was a call for international agreements on investments that cross frontiers as well as a summit of governments, industry executives and union leaders to consider the global problems of the industry. These suggestions to monitor, and if possible direct, the investment process in relation to both public subsidies and employment effects have, at present, not too much prospect of success[26/]. It is important that the extent of subsidy is gradually being realized; yet the fact that these calls are being made is more a sign of the impotence which unions and others feel faced with the massive investments rather than a real indication that things will be done.

The circumstances described here show that the crisis exists but - like all crises - it is advantageous for some, whilst being detrimental for many. The thesis of this report that the global oligopoly is strengthening its position can be seen above all in relation to the command over trade, the fierce reduction in labour use in the sector, and the way in which large-scale investments have been able to play-off one country against another. But to capture fully the extent of the corporate drive through the crisis it is essential to examine the dimensions of corporate behaviour in more detail; that is the subject of the next three chapters, commencing with the technological upheaval.

CHAPTER III

CORPORATE RESPONSE TO THE CRISIS: THE INCORPORATION OF NEW TECHNOLOGY

A. The Impetus

The proximate cause of the reorganization in the auto industry is the pressure on the US home market coming from imports and particularly those originating in Japan. To a lesser extent the impact of legislation, particularly with regard to fuel consumption and pollution, has been a factor. This chapter, as indeed the study as a whole, argues that these are only proximate causes since the real issues in the industry are structural and concern the ability of the traditional TNCs to reassert their grip over labour and markets. However, to understand the deeper issues it is nevertheless necessary to sketch what has been the impact of Japanese production on the US market.

The matter has revolved around the size and apparent insuperability of the differentials in landed cost between Japanese imports and local production. A report by the National Science Foundation in the US argued that "Japanese manufacturers enjoy a cost advantage of between $700-1500 per small car produced. Using internal company data and other proprietary information sources, the panel suggests that the true difference probably lies in the upper end of this range, between $1200-1500. Labour productivity differentials between US and Japanese companies are put at up to 40-50%. Employee costs per hour worked in Japan are about 50-60% of the US average. The Japanese productivity advantage is based mainly on better process and employee management than on superior automation or faster work pace. As much as $100-150 of the Japanese cost savings per vehicle is due to differences in absenteeism[1/]". Another inquiry, examining a range of estimates produced by various investigators, similarly concludes that the differentials are of this order and further notes the sensitivity of the calculations to exchange rate changes. Whether the precise gap is at the lower or the upper end of the range, however, the consequences are serious.

The relationship between R+D costs, scale of production and potential profit margins serves to drive home the significance of the landed cost differentials. "It now takes between 3 and 4 years and $500-700 million to put even the simplest of cars into production. World cars cost twice as much if only 1 million units are sold, each will carry a $500-700 development premium on top of its production costs, enough to wipe out the manufacturers profit. It is considerations like these which have led to estimates that the minimum scale of operations for volume car producers (specialists like Rolls Royce or Mercedez Benz may succeed with smaller outputs) is 2 million cars per annum."[2/] The figures for development premia mentioned here thus fit well with the calculations for landed cost differentials.

The factors behind the gap are several and include labour costs and content, the system efficiencies of Japanese production particularly in relation to inventories, the product mix, the financial strength of Japanese firms and their ability to cushion themselves against outside shocks. In practice the reorganization by US producers, and to a somewhat lesser extent by European ones, has focused heavily on labour questions and relations with suppliers. On the labour side it has been argued that Japanese output has a particularly low labour content: "all reputable statistics indicate that Japanese producers have rapidly extracted labour from the system over the past 15 years[3/]". Direct labour hours per small car in Japan fell from 68 in 1965 to 20 in 1978; it has been estimated that US labour content for similar operations is in the range of 30 to 50% higher. There is little doubt that US firms see technological change as a major way of cutting down the labour content gap.

With regard to labour costs it has been pointed out that "in 1981, US producers paid about $17 to $19 per hour for labour (including benefits) while the most expensive Japanese auto labour costs were in the $10 - 13 per hour range. In addition, US producers pay these higher rates over a larger percentage of the production system. Union rates extend to almost 50% of the system in the US, while the above Japanese rates extend only about 30-40% through the system."[4/] The figures for the European firms would not differ substantially; in both cases the implication which the companies have drawn is that labour content and costs must be drastically reduced. For at least the content side, technological innovation has been regarded as critical.

The impact of legislation has been chiefly to push US firms in the direction of fuel economies. Among the various ways in which those can be achieved, one of the most promising is superior control over ignition and combustion systems. That control is best achieved via the incorporation of recent developments in micro-electronics into the car and in this regard US producers are at the frontier of technological advance - indeed if we look at statistics of computer production without regard to the size and capacity of them, then GM is in fact the world's largest computer producer. At present new vehicles have on average one computer in them and within the next years that average is expected to rise to three.

The technological shifts thus relate to both production processes, with the need to cut out labour, and to the make-up of products, with the need to meet legislated standards. More generally, however, the availability of new technologies has represented a real opportunity for vehicle producers to confront what for them have been crucial and long-lasting dilemmas. The conflicts between the need to increase productivity and yet retain production flexibility have been a constant cause of concern to the industry; as will be seen, the availability of far more flexible manufacturing systems promises one route around this dilemma. Furthermore, the possibilities to incorporate not only micro-electronic devices but also new materials have put the industry potentially on the threshhold of a major switch in industrial orientation, i.e., away from the traditional electro-mechanical base and towards an electronic-plastics base. The fact that many of the technical advances have been carried out by others, but that auto producers could reap the benefits due to their market power as purchasers has added to the attraction.

In sum, then, the pressures from external competition and legislation, in an environment where the domestic market has been severely punctured by imports and in which growth is slow, occuring in a period where major technological advances relevant to the industry have become available, have allowed the auto firms to make a concerted attack on issues of great long-run importance to them. In the first place, the technological option gives a splendid opportunity of eroding deeply the power of organized labour. Secondly, the technological alternatives create an opportunity to attack foreign competition and regain oligopolistic strength.

Thirdly, the greater control over fuel consumption arising from reductions in vehicle weight and superior electronic monitoring systems allows a loosening of the ties between cost and profit on the one hand and petroleum charges for vehicle users on the other. Hence, there is an opportunity to regain command over cost trends and market shares. While in the US, and indeed elsewhere, the demand for vehicles can no longer be so easily manipulated as it was in the past via the massive publicity expenditures, the grip over supply can be kept firmly within the corporate range. It is with this in mind that the companies have switched so rapidly and in such an all encompassing fashion towards the incorporation of new technologies.

B. The Key Technological Dimensions

1. Robotization

The introduction of robots has been made by all TNCs, whether in Japan or elsewhere. The initial emphasis has been on eliminating jobs which have traditionally been very unpleasant for workers and frequently the flash points for disputes between labour and management. So extensive is the use of them that the auto industry is by far the most important sector for their employment. Statistics on the industrial uses of robots find that in Canada in 1981 the auto sector accounted for 63% of all robots employed, in FRG in the same year the transportation sector occupied 46% of the total, in Italy in 1979 automobiles handled 28% of all industrial robots and was the most important sector, while in Japan the 1980 share for automobiles was 30% and second only to the electrical machinery industry[5/]. On a world scale it has been suggested that perhaps up to 60% of the existing stock of robots is now employed in the automotive sector. Some observers indicate that "50% of Japan's industrial robot production (Japan being the leading producer world-wide) is already earmarked for the auto industry".[6/]

Regarding the distribution of tasks, "at present the greatest concentration of robot use in the automotive industry is to be found in areas such as arc and spot-welding, spray-painting and finishing. Robot deburring and cleaning systems are to be introduced in large series-production of cast parts. Robot use for assembly has been limited up to now by the inability of the robot to see or feel but considerable research is currently under way to develop both vision systems and tactile sensing systems for robots."[7/]

What are the advantages from robot use? The first is that in relation to labour, robots offer cost savings and no turnover or absenteeism. "A modern robot welder replaces three or four human workers a typical $40,000 Unimate robot can put in a double shift every day for roughly eight years. When servicing and depreciation charges are included, that works out at less than $5 per hour. Typical assembly line workers in America currently cost $15 per hour in wages and benefits."[8] The second advantage is the tremendous linkage possibilities from the reprogrammable features of robots. It has been indicated, for example, that "the chief gain for VW in its growing automation is not direct labour saving, but the huge increase in manufacturing flexibility offered by modern techniques of robots and computer control.

Beatle production was highly mechanized - 98% of spot welding was automatic - but totally inflexible and needed very high volume with daily production of at least 1500 units. Today automation is attractive for an output of only 600 - 1200 units per day and robots can be reprogrammed for other duties rather than being scrapped when model runs end."[9] The significance of this trend is emphasized by some calculations which estimate that as many as 80% of robots installed in the European automotive industry by 1985 will be engaged in assembly work. The third advantage is that there appears to be considerable compatability between robots produced by different firms. It seems that they can work within the same manufacturing system without significant problems. This fact allows vehicle producers to continually make use of the best available options from the different producers.

Table 9 reproduces some estimates of the expected rate of introduction of robots into different parts of the automotive production process in Japan. The figures highlight the well-known concentration, in the early phases, on welding but show that robot use over a wide range of activities is likely to be quite substantial even by the end of the present decade. These findings are borne out by a similar enquiry in the US. "A Delphi forecast by the American Society of Manufacturing Engineers has suggested that the diffusion of robots in the United States up to 1990 will take the following shape:

Table 9

Technological Diffusion: Expected Rate of Introduction[a] of Robots into Various Automotive Production Activities in Japan,[b] 1980-2000

Activity	1980	1990	2000
Spot welding	44.9	77.5	89.7
Arc welding	15.7	55.9	73.7
Coating and sealing	11.1	51.9	70.2
Material handling	17.9	48.1	60.5
Engine production	12.8	42.5	60.5
Measurement inspections	8.0	39.2	56.5
Assembly operations	4.7	29.4	47.5

Notes:

[a] Measured as the percentage of activity cited undertaken by robots.

[b] 1980 data based on observed performance; expected values for subsequent years drawn from replies to an industry questionnaire.

Source: M. Iguchi *et al.*, "Technological Future of the Automobile in Japan", mimeo 1983.

1. By 1985, 20% of labour in final automobile assembly will be replaced by robots and automated systems.
2. By 1987, 15% of all assembly systems will be using robot technology.
3. By 1988, 50% of labour in assembly of small components will be replaced by automation.
4. By 1990, development of sensory techniques will enable robots to approximate human capability in assembly operation."[10/]

The market expansion is of great interest to auto firms since the structure of production in that market is also undergoing rapid shifts. First, several car firms are major robot producers themselves. In FRG, which is Europe's second largest producing country behind Sweden, VW is the market leader and although a large proportion of its output is used internally, the growth of sales still allows good prospects for diversifying sources of earnings. Similarly in France Renault (via ACMA) is a major producer, while in Italy Fiat (via Comau) occupies a high place in the ranking. Second, there is the prospect that very important TNCs who have so far stayed out of the market may move in - IBM is the chief example.

It has been building robots for its own use for about a decade, and it has been suggested that "IBM robot technology may be so good that it could catapult straight into the fastest growing part of the robot market."[11/] That segment is the assembly of manufactured pieces to make a final product; and it has been estimated that these assembly robots could provide up to $1 billion worth of sales in the US in 1990. It seems that the IBM robot is better able to switch tasks than are some others and has considerable capabilities of self-correction. Third, there can be little doubt that international trade and investment flows in robots are likely to increase dramatically.

This implies the prospect of not only increased export earnings but also the capture, perhaps through the investment route, of market shares in areas hitherto unexplored. Up till now the US market had been dominated by two producers, Unimation (which is now a subsidiary of Westinghouse) and Cincinnatti Milacron. But with large investments by GM, Bendix and other major TNC, the market structure is shifting and foreign firms cannot afford to stay out. The Swedish producer ASEA is currently building a plant in the US, while Renault has joined with the American company Ransburg to set up local production facilities. Collaboration agreements have been made with some of the Japanese producers in an effort to control their sales to the US market. As things now stand the trade picture shows European countries (and particularly FRG) as substantial importers, with Japan a large exporter and a minimal importer. Clearly the corporations have captured the message learned from auto production itself, i.e., that Japanese enterprises will go for direct export rather than foreign production until they are driven into the latter.

All these changes, therefore, demonstrate that the auto industry has been quick to utilize the advantages offered by robots, that those advantages have allowed it to reduce drastically its dependence on labour, that there is every prospect that robots can contribute to the expansion of flexible production systems, and that auto producers themselves are realizing the potential which can come from their own production of robots. This aspect of technological advance has thus been firmly taken in hand by the auto industry and in the next few years will be developed still further.

2. CAD/CAM

Computer-aided design and manufacturing systems (CAD/CAM) have in fact been available for some time, but it is only very recently that they have begun to be incorporated on a significant scale in auto production. The former, CAD, is of enormous importance for design and engineering work since it allows computer storage of multiple designs, modifications to them without major redrawing, and the use of the same computers to handle all of the calculation questions which arise in designing machine tools. At the same time the improvements in design capability and reduction in time spent can be linked to international co-ordination of design teams. Thus "through CAD systems, the productivity at GM design departments, for instance, is reported to have increased by a factor of three and the design time for a new car model to have been reduced from 24 to 14 months. Design time for single components is reported to have been reduced from 6 months to 1."[12/] CAM systems involve the use of computers in the logistics of control of groups of machines, in automatic inspection and in systems for partly unmanned production. In principle the two can be worked together to allow integrated CAD/CAM organization, but in practice this is yet to be fully realized and several partial systems are still in use.

It is the handling of the computer supported methods which is bringing the FMS into play. These involve not only the savings in labour mentioned earlier but above all the opportunities to combine large scale production methods with the manufacture of vehicles that have custom made characteristics. Some idea of the savings can be obtained from the activities in Fiat, which have essentially run through three phases. The first of these ('Robogate') was introduced at the Rivolta and Cassino plants in 1978 and involved the introduction of electronically controlled multiheaded welding systems used for body assembly. This method allowed several workers to be replaced by one skilled engineer/operator. The second phase ('Digitron') was introduced at the Mirafiori plant in 1978 and was a magnetic machine transfer system used in the final assembly of the body to already assembled sub-frame and mechanical parts. This system permitted considerable plant flexibility and automated central control; it was, in short, a decisive step towards a modular system of production where work on different models can be carried out in distinct modules.

The third stage ('Lam)' involved electronically controlled magnetic trolleys which transport engine components for final assembly to fixed stations where islands of workers assemble the engines. This was introduced at the same Mirafiori plant in 1980 and its consequences have been substantial. 20% fewer workers now produce 4.3 engines per shift against a previous production of 3 per shift, thus meaning that direct labour time per engine has been reduced by a large proportion. Different engines can now be assembled at the same time and there is much greater flexibility in the type of engine produced; indeed the Mirafiori plant is now operating with 110 detailed engine specifications. This example could easily be multiplied.

The important point is that "in manufacturing the greatest impact has probably been on the assembly line principle, where the introduction of the system has resulted in a dramatic increase in versatility the number of permutations is tremendous and through computer control it is possible to handle each vehicle individually, according to customer demand (the increase in) flexibility of the arrangement of assembly operations makes it possible for the workers to perform a number of operations with the vehicle stationary. The system also makes it possible to take a defective vehicle out of the line for repair; in a traditional assembly line, repairs can be undertaken only after the vehicle has gone through the line".[13/]

The employment effects of these systems have so far certainly been significant though perhaps not as dramatic as robotization *per se*. CAD has increased the capacity and capability of design departments and permitted a streamlining of them; hence there have been employment reductions though perhaps not on a large scale. CAM, on the other hand, as can be seen from the Fiat example, is leading to important changes between skill categories as well as to an overall reduction in unskilled labour.

In its recently launched model, the Maestro, BL employed CAD/CAM methods on an unprecedented scale and it has been suggested that "Maestro represents the first time that the master data base has been followed exactly for all aspects of developing and manufacturing the model".[14/] Executives at BL have suggested that in addition to the design advantages mentioned above, other gains in the course of producing the Maestro included cuts in the requirements for proto-types and their testing, a sharp reduction in lead-times, and the far easier incorporation of late design changes. It is indicative of the possibilities that some of these gains stretch well beyond the productive system itself; in short, there are most probably strong cumulative effects at work which will allow one kind of technological change to build on another. In this respect we are still in the early stages of CAD/CAM use.

Although much has been written about robotization, the fact is that the real gains derive from the versatility and flexibility stemming from the computer organized system changes. Once those are introduced on a large scale then the assembly line system as traditionally known will have been destroyed, the link between large-scale and custom-made production will have been cemented, and the composition of the labour force in an automotive factory will have been shifted decisively to skilled operators working via electronic systems rather than mechanical ones. It is that which is at the core of the technological revolution now sweeping the industry. It is for that reason that so much investment is going on, and for that reason also that the Japanese producers are devoting so much attention to this central technological issue.

3. Electronics

The preceding paragraphs have emphasized the indirect role of electronics in car production through their use in computer systems which are now transforming the face of the car factory. Yet at the same time electronics are being increasingly introduced into the product itself, i.e., their influence covers both process and product changes. Though estimates vary, the general consensus is that by the end of the decade electronic items will represent around 20% of the value of a car. In the past their use has been strongly oriented towards entertainment aspects of vehicles - e.g., cassette systems - but now the focus is very much on performance, efficiency and safety of the vehicle. The drive to economize fuel use has been central in the new orientation and electronic devices, particularly micro-computers, have permitted the integration of all the elements required to achieve optimum engine performance. Instrument panels have not only had their traditional form altered to an electronic one but have become greatly increased in scope with the possibilities rapidly growing for on-route mapping to be carried out by micro-computers for the driver, indications to be made regarding braking and similar items of safety and efficiency.

Thus, the electronic revolution is altering the internal workings of the vehicle as well as the information which can be permanently passed on to the driver. An indication of the way in which things may develop is given by some recent estimates for the European semi-conductor and integrated circuit markets. In 1982 the former was valued at $3.2 billion, of which the auto share accounted for only $0.14 billion; the integrated circuit market in Europe in the same year was around $2 billion with the auto share a minimal figure of under $50 thousand. These two markets are expected to grow over the decade 1983-93 by 22% and 25%, respectively. An analysis of potential user sectors in both cases suggests that the auto industry will outstrip others, with projected growth rates of purchases of semi-conductors at 25% and those of integrated circuits at 34%. These figures, once again, underline that this aspect too of the technological incorporation process is also still at an early phase.

It has become rapidly more crucial for the auto TNC to link up with major producers in the electronics field and in recent years there has been a fast expansion in the number of JV and other collaboration arrangements between the two groups[15]. This point will be dealt with in further detail in Chapter V but the strategic significance is worth mentioning here. While, up till now, the auto producers have been able to reap the benefits of technological advances carried out elsewhere, it is becoming increasingly necessary for them to obtain a much firmer grasp on the directions of change. How far and in what ways to do this is a tricky question since the component producers enjoy substantial experience, are often TNCs in their own right, and in any case are selling to a variety of users and not just the auto sector. For auto TNCs to specialize in this kind of production could be a hazardous business and there can be little doubt that the collaboration route has been chosen as the most appropriate way of steering between the two dangers of overspecialization and marginalization from the mainstream of technological change.

4. New Materials

The target for changing the material composition of the car has been its use of steel. The reason is quite simple: the fuel consumption of vehicles is related to their body weight and since fuel costs in the late 1970s were well above their levels of a few years earlier, producers have sought to economize on fuel by cutting down vehicle weight. Four kinds of developments have taken place: the introduction of newer quality steels which are lighter, the use of aluminium as a steel substitute, the first experiments with ceramics, and finally the introduction of plastics and particularly structural plastics (which are composite materials).

It is the development in plastics which is potentially of the greatest significance since their use permits not only reductions in vehicle weight but - and this is far more important - altered methods of vehicle manufacture. "Auto bodies and body components in aluminium are basically manufactured in the same way as steel, but special tooling and modified welding equipment are needed. Body components made from plastics will usually need a different type of manufacturing technology than that used for steel and aluminium components, viz. injection moulding, reaction injection moulding and sheet moulding compounds. The manufacturing techniques for plastic components will also make it possible to replace sheet metal parts fabricated from several stampings by one integral component."16/

The rub, of course, comes in the last part of the quotation, since it suggests how the method of car body manufacture would be radically changed by a move away from metals to plastics. BL had, towards the end of 1982, produced a test car (ECV3) with a metal skeleton and plastic planels and as the company's managing director indicated "the implications for manufacture are immense. We are an industry whose accumulated expertise lies in the pressing and welding of sheet metal ... (but the new cars) will render much of that experience obsolete, for the plastic car will demand new technologies and new processes."17/

In this area also the industry is still in the early stages of radical technological change. At present only about 5% of car body weight is in the form of plastics and most of those are confined to fairly secondary and unimportant uses. Predictions suggest that by the end of the decade the proportion may have doubled and that the key type of plastic will be reinforced polyurethanes which can also be made by a new process which only takes 60% of the time even of reaction injection moulding. Hence, plastics will reduce body weight, improve fuel consumption and, most of all, affect manufacturing methods.

The potential for use of ceramics also seems to be considerable. For some time discussion has focused on ceramic engines which offer the possibility of substantial fuel savings; Isuzu, for example, reckons to cut fuel consumption by close to one-half through ceramic rather than conventional engines. But fuel saving is likely to be only part of the possible benefits. The recent announcement of a JV to mass produce a new ceramic material, Syalon, by Lucas Industries and the Cookson Group in the UK suggests some of the other advantages. The ability of Syalon ceramics to withstand high temperatures, thermal shock and to demonstrate exceptional durability indicates possible major uses in machine tool cutting. This implies that vehicle producers could well be employing equipment which itself derives from ceramics in the production of components made up largely of ceramics.

It is striking that in this area of new materials, just as in electronics, there seems to be a symbiosis between new technological possibilities which alter production processes and those which alter the nature of vehicles. The industry is thus in the highly fortunate position where process and product changes can interact and have cumulative impacts on each other. Potentially this means that the gains in productivity, product quality and production flexibility are enormous. The price implications of all of this are, however, far from clear.

C. The Consequences of the Technological Response

Before proceeding to the next dimension of corporate response, it is as well to try and summarize the main results (already before us or on the way) of the incorporation of new technology by the auto TNCs.

(i) The product

The composition of a car is now quite different from a decade ago and the changes in it will proceed at an accelerating rate in the next few years. The costs of passenger cars are likely to rise, and indeed the shift towards higher quality basic vehicles most probably represents a key strategic response by the corporations to the low projections of demand growth.

(ii) The production process

Fordism has ended. The new technologies allow large scale production and flexibility to be achieved simultaneously through the use of computerized manufacturing systems. Design can be undertaken far more efficiently than before with very substantial cost savings. The auto industry is in the forefront of sectors using and diffusing these technological changes.

(iii) The inter-industry linkages of the sector

The auto sector is moving quickly away from its past ties to electrical and mechanical sectors and in the future may have much more to do with electronic and chemical manufacturers. Hence, the industry will remain a key node in the input-output matrix; but it will be of a qualitatively different kind than before. One implication is that it is only industrial systems which can provide the totality of these linkages which will benefit from them; for the rest the split is likely to grow.

(iv) The impact on labour

In the OECD countries we have now moved to a permanently smaller labour force aimed at carrying out qualitatively different tasks. The auto factory as a point of agglomeration for labour movements is being diluted. By the same argument the prospects for international solidarity of labour groups, a difficult objective to achieve at the best of times, are now dimmer than ever.

(v) The impacts on developing countries

The technological changes are setting fresh standards throughout the industry. Large-scale production in developing countries is carried out by TNC affiliates and it seem unlikely that they can avoid at least part of the organizational and production changes. To the extent that exports are of the intra-trade kind - which is in fact by far the dominant type - the quality and standards changes will set the pace. More than ever, developing countries will be forced to conform to the norms set from the core producers.

CHAPTER IV

CORPORATE RESPONSE TO THE CRISIS; MANAGEMENT, LABOUR AND SUPPLIER FIRMS

A. The Japanese Model

It now seems to be widely accepted that the cost advantages which Japanese producers hold cannot be traced to one single factor but rather to the systemic organization which characterizes that economy in general and the auto network in particular. That system has been built over the past three decades though its origins go back much further and are related to the specific modes which Japanese capitalism exhibits. The fact that the Japanese norm now seems to be the yardstick by which other producers judge their operations, and that these firms are striving to introduce a Japanese style set-up within a very brief period is tantamount to an organizational revolution in the industry. The changes encompass management, labour and relationships with supplier firms.

It is ironic that to some extent the system organization builds upon changes which were first introduced by the US in Japan following the end of the 1939-45 war. Thus "a number of the management systems and labour policies used by Japanese companies in reforming were actually American in origin, and some were forced on the industry by the occupation administration ... Japanese auto companies were also substantially resurrected by American vehicle contracts during the Korean war."[1/] At a later date the Japanese themselves made extensive use of foreign technology: "between 1955 and 1971 Japanese assemblers entered into 95 technology contracts with firms from 9 countries; between 1955 and 1971 Japanese parts and components suppliers concluded 300 contracts for technical aid."[2/] What is now happening is an attempt by other auto producers and in particular the US firms to restructure not only their own plants and whole corporations but also the very industrial systems of which they form the hub.

It is still unclear whether the labour content and cost advantages held by Japanese producers and mentioned in the preceding chapter could be eroded without altering significantly the level of factory safety and worker protection which is usual in the US and Western Europe. Although that level itself still leaves much to be desired, the fragmentary evidence available indicates that standards in Japan are appreciably lower. What in practice is likely to happen is that the technological transformation of the industry examined in Chapter III will itself reduce a certain number of the riskier jobs and to this extent maintain standards which are accepted, albeit reluctantly.

Looked at from a somewhat different angle, the apparent docility of the Japanese labour force seems to be connected with the strong measures that were taken back in the 1950s to eradicate persons who were regarded as politically troublesome. There is every appearance that Japanese unions are to a considerable extent instruments of the corporations; and indeed union organization is on a company basis rather than a trade basis. To institute those conditions in other OECD producers would be a political and social shift of major proportions and, despite the relative weakness of labour at present, such a change is not (yet) on the cards. These observations are made simply to indicate that there are limits to the extent to which the Japanese model can be introduced into producer firms and industrial systems operating elsewhere. Wherever possible, however, it does seem that serious efforts are being made to reorganize the system.

B. Plant and company changes

A much vaunted aspect of the Japanese production system is the alleged absence of antagonism between management and labour. Both groups are, it seems, infused with the need to improve product quality and the contacts between them are formalized in the now famous quality circles. These are groups within plants comprising workers of various kinds as well as managers and their purpose is to consider on a regular basis the ways in which production processes can be ameliorated and product quality enhanced. Among other things these groups serve to drive home the idea that each worker should control his own quality, i.e., that though a separate quality control function is necessary, the best improvements come through inducing quality consciousness into each individual worker.

It is hard to say to what extent quality circles have been formally introduced in auto plants elsehwere and what their impacts have been. One estimate suggests that approximately a third of the work force of Ford of Europe now takes part in quality circles, though very few of these exist in Britain because of failures to reach agreement with the unions. Yet even in the highly conflictive Halewood plant, the first time capability of quality in production for cars has been increased from 55 to 80% and production workers are now trained to do simple maintenance and repair. Indeed in the Ford plants in FRG it has been discovered that about three-quarters of maintenance time is caused by break-downs of less than 10 minutes which in the plants in that country are repaired by the operator.

These efforts at quality improvement and the creation of a team atmosphere have been backed up by changes in remuneration systems. Now the emphasis is strongly towards payments which contain a lower proportion of standard wage to possible receipts when quantity and quality standards are met. In other words, the incentive to improve performance is a financial one. It is for this reason that TNC, and again Ford is the leading example, are devoting much attention to the break-down of job demarcation lines within factories. The idea is to make the work-force, as well as the production system in its totality, far more versatile. These are the kinds of concessions which the companies have been obtaining in their more recent settlements with the unions. Not only have wage costs been kept in check, but the companies are creating for themselves an open field on which to expand productivity. In return for this labour has received, thus far, very little - though there is some talk of companies gradually moving in the Japanese direction of life-long contracts with individual workers.

The attempt to streamline factory organization would only be of limited impact unless the corporations could affect also the management side. In the past couple of years GM has removed about 30,000 salaried employees from the company and has been altering its management structure in no uncertain terms. The effort now is to unify key groups in the management hierarchy on a transnational basis. In other words, there is a greater degree of centralized planning of overseas operations and a streamlining of design and engineering activities. As the management organization alters, reinforced by stronger monitoring over ways to meet objectives, so the functions of individual plants are becoming still more specialized. To put the point sharply: whereas within plants the organization is moving to flexibility, each plant is nevertheless being given a more precise function in the total corporate network. The plants now have much less of a versatile character than was formerly the case and instead their role is to fit into a production network established by the centre. This change has significant implications for developing countries.

C. The Supplier Relation

Earlier comments have emphasized that the non-Japanese TNCs have become acutely aware of the importance of reorganizing the industrial system which supplies them. It is possible for that to be achieved since these TNCs in their own countries and sometimes in foreign ones as well are at the hub of whole industrial systems for which they can set the standards. The relations between them and the supplier firms are asymmetrical i.e. the technological range of even the strongest component supplier does not counterbalance the power of a vehicle-producing TNC, though of course the power differential does differ quite sharply from country to country and thus from enterprise to enterprise. The reoganization of supplier systems has begun since the auto firms have become aware of several possibilities which they had not previously exploited.

Bearing in mind that bought-in components account for 40-60% of vehicle cost (and in most cases the percentage is in the higher part of the range), the gains to be made from cost cutting in this dimension are potentially very considerable. The options revolve around the reduction in system inventories, upgrading of the quality control exercised by each supplier, moves towards sourcing particular parts from only one supplier instead of several, and changes in the contract life between vehicle producers and suppliers. The following paragraphs examine these and related issues in further detail.

Perhaps the most widely talked about feature of Japanese industrial practice has been the so-called 'Kanban' or 'just-in-time' inventory system. The point is very simple. Large-scale production where substantial inputs must be supplied from external sources requires either that large stocks of parts are held by the final producer or that a finely tuned system for delivering parts is put into operation. To put things in somewhat simplified terms, in the past auto companies had opted for the former approach whereas now they are moving sharply towards the latter. Even around the end of the 1970s GM used to carry, at any one time, some $9 billion of inventories, an amount equal to some 13% of its overall operations. A streamlining of such a system can release substantial amounts of working capital and thus increase the profit possibilities of the firm; by mid-1982 GM had cut that figure by around 11% and it is expected that within a short period the overall reduction will have reached 25%. To give another example, this time on an international scale, Ford in its plant at Valencia in Spain draws on 212 Spanish suppliers, 151 firms in FRG, 71 suppliers in UK, 4 in Netherlands and 2 in US. At any one time just among the Ford plants in Europe there are some 12,000 tons of components in transit. Again the advantages from a streamlined system must be significant.

The Kanban system, ironically enough, was something which Japanese enterprises developed from a system pioneered in Ford's own industrial complex set-up at Rouge near Dearborn, Michigan in the 1920s.[3/] At that time Ford wished to concentrate all aspects of auto production in a single location. Subsequently producers of parts spread out over a very wide area in the US, transport costs and delivery times rose rapidly, and the possibilities for direct control over quality were reduced. The Japanese auto complex has been developed with very strong regional concentration. In most cases parts suppliers are to be found within a radius not normally exceeding 100 km from the vehicle producer. More importantly, the delivery times are usually reduced to only a few hours due to computer control systems. It is this type of arrangement which the US and other firms are now introducing in their domestic operations.

Thus far discussion and implementation of the 'just in time' approach to supplier relations has been conducted as if the only factor worthy of consideration was the saving of inventory costs. But the approach does raise other issues. It has worked well in Japan primarily because of the existence of three conditions: harmony between management and labour, such that the industry has been virtually strike-free and thus not susceptible to interruptions of supplies; close collaboration between vehicle producers and component suppliers in terms of design and organization; and sophisticated information systems which allow monitoring of both final markets and use in production on a regular basis. In short, it has been relatively risk-free and based on the implicit assumption of harmony among all agents in the industrial system. The application of the approach in the US and Europe, where contemporary industrial history has been very different, may turn out to be a far more difficult proposition. There is already evidence that Chrysler has had to accept wage demands in component producers which it probably would not have accepted had its supply lines not been so vulnerable.

The burden of reorganization falls heavily on parts suppliers following the factors mentioned above. Now we have a situation where "GM will insist that component suppliers in many cases have plants located within a 100 mile radius of the GM facility they supply so as to be capable of delivering within one day to the assembly track."[4/] Quality control over the parts is being thrown much more on to the shoulders of the component firms themselves as the vehicle producers introduce a checking system which in effect amounts to acceptance or rejection of components at the assembly plant gate. In the past defective components often entered the production system and problems were not tackled until the manufacturing process was by and large complete. This created much higher costs and in the end a higher rate of defective vehicles than is anticipated under the Kanban scheme. But the key point is that suppliers themselves must improve their product quality.

At the same time there is a sharp move towards reducing the number of outside component suppliers; it has been suggested that GM may be in the process of cutting the number of firms with which it deals from around 20,000 to only half that figure. This is to be achieved via single sourcing rather than multiple sourcing of the same part, as well as through a reduction in the total number of parts consequent on the technological changes described in the preceding chapter.

Turning to the European environment, the position is similarly changing towards a slimmed-down structure. This can be seen very clearly in Italy, where Fiat is now using its considerable power in that market to bring together the more than 5,000 suppliers and to deverticalize the structure in such a way that less preassembly work and quality control needs to be carried out within Fiat assembly plants. In UK, BL is moving to a single sourcing system and thereby cutting out several of the parts suppliers. For them the situation is one of crisis, as their most important domestic customer decides in favour of one rather than the other instead of splitting orders between them. Quite clearly these changes amount to a transformation of the structure of the components industry.

The Commission of the EEC says there are "in Japan 350 companies supplying components to the Japanese auto manufacturers, whereas in Europe there are 1,750; on the whole Japanese companies are larger, some 85% of them having a workforce of greater than 100, as compared with less than 60% in this category in the FRG and about 40% in France ... In the USA and, more importantly, in Japan a large number of component manufacturers are under the financial or commercial control of the auto producers (in Japan 83% of all components were supplied as original equipment), but the situation is the reverse in the Community, where most component manufacturers are financially independent and where roughly 50% of all the components produced are intended for the spare parts market"[5/]. In the US a recent survey has drawn attention to these structural features and the dependence of parts suppliers on the auto firms. At the end of the 1970s around 60% of total output from the component firms was absorbed by GM, Ford and Chyrsler, with GM alone taking about half of this. Officially some 2,000 enterprises are classified in the US as being engaged primarily in parts manufacture, though only about 20% of this number have annual sales in excess of $0.5 million.

Taken together, the changes mentioned imply that the components industry is now going through the most challenging period of the last few decades. The prizes for those who survive will be enormous, in terms of huge contracts and long production runs; but there will also be many firms which do not obtain further business and will be forced either to find clients elsewhere or drop out altogether. The situation has been described as follows: "The vehicle manufacturers are moving towards fewer model ranges with fewer parts in each model and, in many cases, shared components. They also look for long-life components requiring little or no attention during the lifetime of the vehicle. This adds up to fewer individual contracts for the component supplier, with those contracts likely to be enormous, involving huge production runs. The size of the output that will be required in future tempts the vehicle groups to think about further vertical integration and more in-house component manufacture. Some groups have in any case decided as a matter of principle to become more heavily involved in component making because there is, in their opinion, more profit to be made there than in vehicle assembly."[6/]

These observations show how the parts sector is likely to become more and more dominated by a small number of large producers, each of them closely involved with one or two vehicle producing TNC. At present GM and Fiat are relatively the largest in-house producers - i.e., they manufacture a good proportion of the parts they use themselves and at the same time sell to other producers. GM, in fact, is one of the most powerful of all firms in the component production business, while Fiat, on its side, claims that it supplies at least some parts to every other major manufacturer. Collaboration arrangements will, as is discussed in the next chapter, grow apace between vehicle firms and components producers. The purpose of these deals is primarily to work together on the creation of new components which will then be produced chiefly by the supplier firm. The largest of the parts producers thus have substantial R and D activities (both Robert Bosch and ZF are reputed to spend around 7% of turnover on R and D) and for them continued market strength comes from guaging accurately the directions of future technical development. The market prospects are better to the extent that the supplier firms can develop their relations not only in the home country of the vehicle producer but also in those nations where it has established important affiliates.

The reproduction of industrial systems in countries other than those where they were developed is an increasingly important feature of the auto business. As far as developing countries are concerned, this comes out forcibly in the substantial denationalization of the components sector which has occurred in recent years and thus compels a reinterpretation of the meaning of LC. Looked at from the other angle, the component producers may be in a phase where, at least as far as the non-Japanese enterprises go, foreign sales will come much more from affiliates established in those countries than through export.

Either way, however, the key feature of the newly emerging structure is the reproduction in critical locations of the inter-industry links between vehicle producers and major component firms. In most cases those links are between firms of the same national origin, and in order for them to develop, a vital factor is the extent to which the vehicle producer itself is surviving in the global struggle. Where it is, then the component supplier can flourish, but where the national firm is weak - e.g., BL in the UK - then the anchor for the parts supplier is ripped up and the prospects for it to establish special ties with external vehicle producers cannot be regarded too favourably. The denationalization process raises important questions about the extent of support which can or should be given to the parts sector, especially in DC where so few significant independent national firms are left. This point will be considered again in a later chapter. Finally, all the signs point to an increase of Japanese activity in world component trade. The question is whether these firms will be able to operate without engaging in significant direct foreign investment. Part of the answer depends, of course, on the strategy of the vehicle producers. To the extent that they invest abroad and are unable to find adequate local suppliers, but at the same time are subject to LC requirements, then there will be every incentive for parts manufacturers from Japan to set up in the country and continue to meet the needs of vehicle producers. Whether a Japanese type industrial enclave of this kind could begin to flourish in foreign locations is thus a big question for the next few years.

The component industry is thus bearing the brunt of much of the reorganization now underway in the vehicle producing sector. Just as the global oligopolistic struggle has eliminated some vehicle producers and is likely to eliminate one or two others, so the process of industrial concentration is now occurring at a rapid rate among parts producers. The co-ordination between the larger firms, who will survive, and the vehicle producers is growing and one of its effects is likely to be greater international similarity as between industrial structures in the auto sector. Though much literature continues to talk of the prospects for small and medium sized industrial enterprises, and though reference is frequently made to metal-working branches as a key area for the development of such firms, the auto industry experience argues strongly against these prospects being bright. The fact is that the concentration of power, the nature of R and D, and the determination of vehicle producers to establish and develop preferential ties with only a small number of parts firms, does not bode well for the future of the smaller firms. These considerations are reinforced when we look at the next dimension of corporate response to the crisis, namely the internationalization of the industry.

CHAPTER V

CORPORATE RESPONSE TO THE CRISIS: COLLABORATION, OFF-SHORE SOURCING AND GLOBAL INTEGRATION

A. Uneven Internationalization

In the two preceding chapters we have focused on the incorporation of technological change and the reorganization of both companies and the industrial complex of which auto firms are the centre, as two key elements of corporate response to the crisis. References to internationalization have been scattered through that text but in this chapter we consider this aspect in more systematic fashion. To do so, it is worth recapitulating a couple of the basic points.

Though auto production takes place at different levels in quite a few countries, the core producing areas are rather few in number. Within the OECD only half a dozen countries are major producers (US, Japan, FRG, France, Italy, Spain and UK), whereas among the developing countries production is heavily concentrated in Brazil, Mexico, Argentina, the Republic of Korea, Yugoslavia and India. The TNCs tend to be concentrated, at least as far as their main production bases are concerned, in a small number of countries with the two US giants focusing their production in the US itself, two or three countries in Latin America, and a similar number of locations in Western Europe. VW nowadays has almost all of its output in FRG, Brazil, Mexico and the US while Renault is linked chiefly to production in France, Spain, US and Latin America. The Japanese firms produce almost everything inside Japan itself and are only in the first faltering stages of internationalizing their production.

Consequently the global scope of the industry has to be interpreted with care. There is no doubt whatsoever about the power exercised throughout the world by the vehicle TNCs. In production terms, nevertheless, their activities remain relatively confined to a few locations and with a quite pronounced regional bias for each TNCs. One of the key issues in the present phase is the extent to which this segmentation or regionalization of the international behaviour of the TNC will persist. To put the point another way, to what degree will a real integration of locations occur in the next few years? The fact that the international production behaviour and full integration are not yet the same thing is why a distinction has been drawn in this chapter between off-shore sourcing and global integration as such. It will be seen that while the former is proceeding quite rapidly, the latter has a less sure way forward.

The uneven internationalization in terms of production sites is now also being affected by the collaboration strategies of the TNCs. Though various types of link-up between firms have existed in the industry for many years, it is only in the last few years that the explosion in collaboration has occurred. Whether these moves are attempts at survival strategies by the weaker enterprises, whether they represent aggression by the stronger ones, or whether they are simply ad hoc adjustments to specific circumstances is precisely one of the issues to be debated. The important point to underline, however, is that practically every firm - whether a global leader or a much smaller entity - now finds it useful to have some kind of formal tie-up with other enterprises. This in itself is a strong indication of the international perspective which is shared by all. No-one can doubt that the survival of enterprises is being decided on the global stage; though internationalization has its peculiarities in terms of regional emphasis, without a foreign dimension no-one survives.

B. The Growth of Collaboration

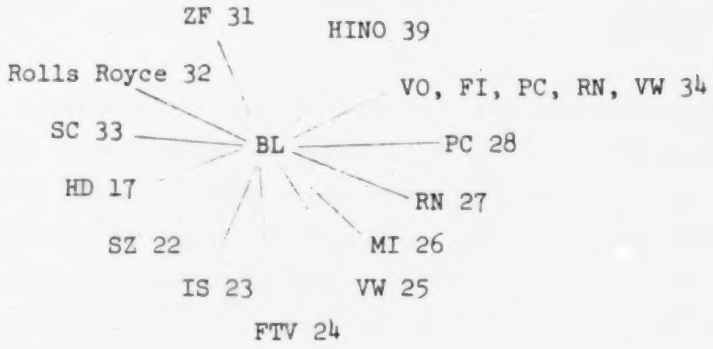
Arrangements between enterprises cover a wide variety of links, including JVs as such, cross-shareholding, agreements to collaborate on production of components, arrangements covering joint research, marketing and distribution accords, and still others. The evidence to be presented in this section covers all of these. It cannot pretend to be completely up-to-date since the arrangements are in a constant state of flux; most of the major kinds of accords are covered. The charts shown here are drawn from the detailed information on collaborations given in Appendix 1 and the numbers shown refer to the same numbers of that appendix. The material in the charts concentrates first on the links of the main vehicle producers of which nine have been singled out. In order to keep the charts relatively simple to read abbreviations have been employed for the enterprises concerned. Following the nine corporate networks the next chart looks at collaboration from the perspective of four developing countries, Mexico, India, the Republic of Korea and China and tries to divide those collaborations according to the region from which the other enterprises originate. Finally, the ownership chart focuses on the links among the major vehicle producers from the viewpoint of equity relationships.

The data suggest several features of the collaboration map. GM has very few links compared to most other firms and indeed those links are of limited importance, save for the arrangement with Toyota, (a JV to produce small cars in the US) and the links with Isuzu which allow GM to import vehicles from that company into the US. Both of these arrangements are unequivocally aimed at consolidating GM's involvement in the sale of Japanese style small cars in the US market. The arrangement with Daewoo in the Republic of Korea is also a JV with GM holding 50% of the equity. So far that arrangement has not led to other significant developments but, as mentioned briefly earlier in the study, the long-term strategic aim of GM is most probably to keep a firm grip on developments in the auto industry in the Republic of Korea. To the extent that the company's joint ownership of Daewoo can serve to prevent Hyundai from rationalizing the industry in that country, and from moving into the forefront of international production, then it will have been a good investment. From the other side, Daewoo could eventually be integrated into the GM international production network.

Ford has a wider range of links, yet most of these do not have the same strategic significance as the GM holdings in Japan and the Republic of Korea. The most important shareholding is the 25% held in Toyo Kogyo, acquired in 1979. The Sumitomo Bank, a key shareholder in that firm, apparently agreed to the sale on the understanding that Ford would try to bring that firm into its global network; it seems indeed probable that Ford's purchases from Toyo Kogyo now reach around $1.5 billion per annum. Interestingly enough, when Ford made the purchase it had to give an undertaking to the US government that it would not take control of the Japanese firm since there were worries about the impact of such a move on competition in the US. The other agreements shown in the diagram are mostly of limited scope. This finding confirms for Ford what has been seen for GM, namely the absence of any appreciable involvement with other companies in joint research projects. The two US leaders, therefore, who are also the world leaders, are mainly trying to push through their own strategies while limiting involvement with others.

CHART I

JOINT VENTURES AND COLLABORATION ARRANGEMENTS OF MAIN AUTOMOBILE PRODUCERS, 1983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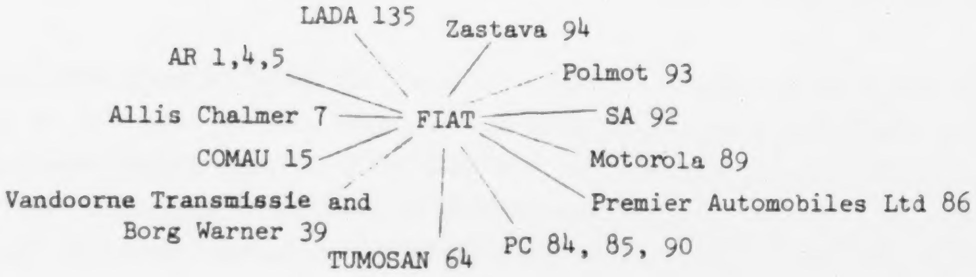
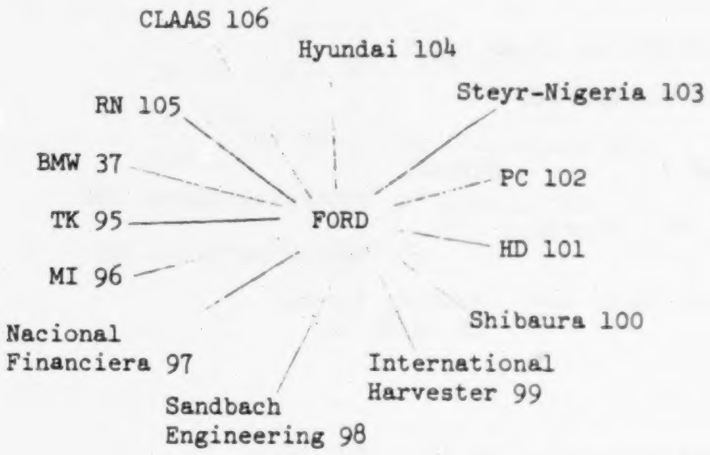
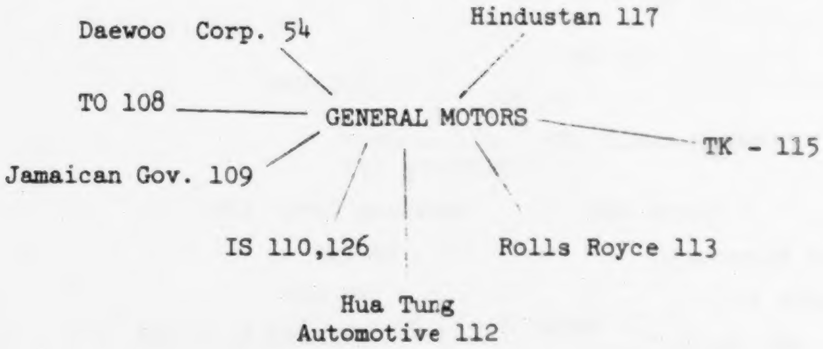
HINO 39
Rolls Royce 32
VO, FI, PC, RN, VW 34
SC 33
BL
PC 28
HD 17
RN 27
SZ 22
MI 26
IS 23
VW 25
FTV 24

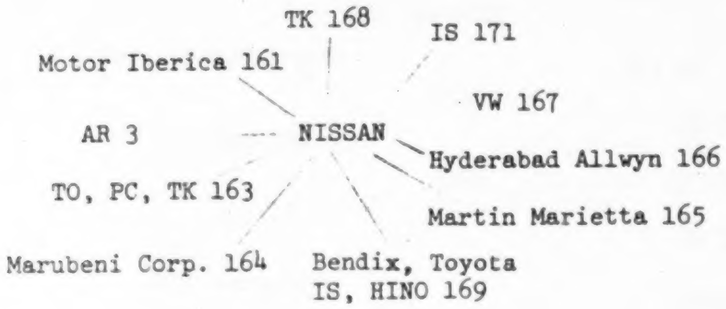

LADA 135
Zastava 94
AR 1,4,5
Polmot 93
Allis Chalmer 7
FIAT
SA 92
COMAU 15
Motorola 89
Vandoorne Transmissie and
Borg Warner 39
Premier Automobiles Ltd 86
TUMOSAN 64
PC 84, 85, 90

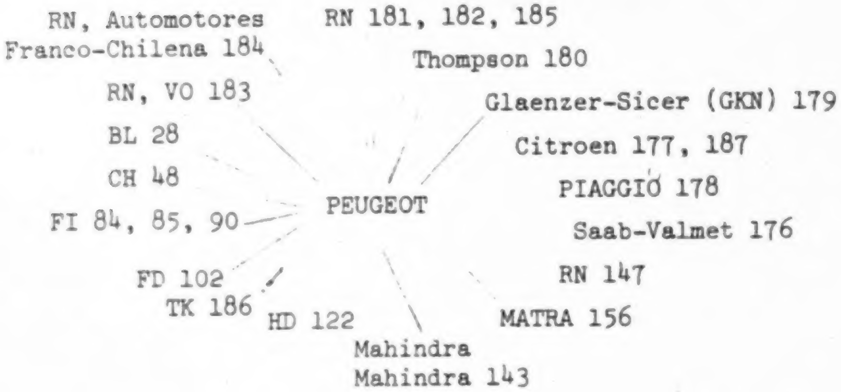
SOURCE: Automotive Industry Data Ltd., Joint Ventures and Collaboration Agreements, February 1983.

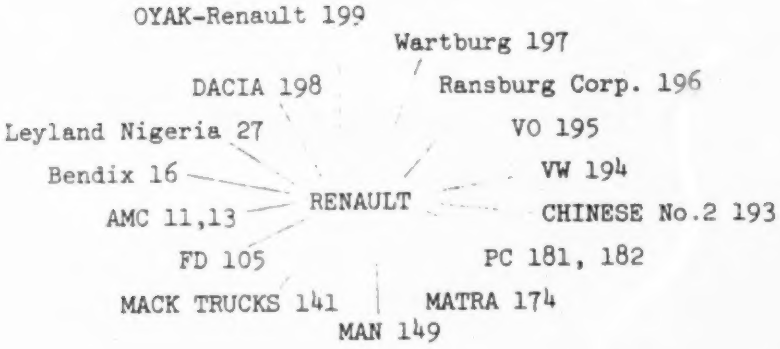

CLAAS 106
Hyundai 104
RN 105
Steyr-Nigeria 103
BMW 37
PC 102
TK 95
FORD
HD 101
MI 96
Shibaura 100
Nacional
Financiera 97
International
Harvester 99
Sandbach
Engineering 98


Daewoo Corp. 54
Hindustan 117
TO 108
GENERAL MOTORS
TK - 115
Jamaican Gov. 109
IS 110,126
Rolls Royce 113
Hua Tung
Automotive 112

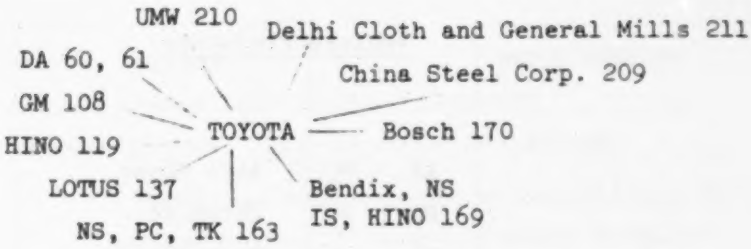
SOURCE: Automotive Industry Data Ltd., Joint Ventures and Collaboration Agreements, February 1983.

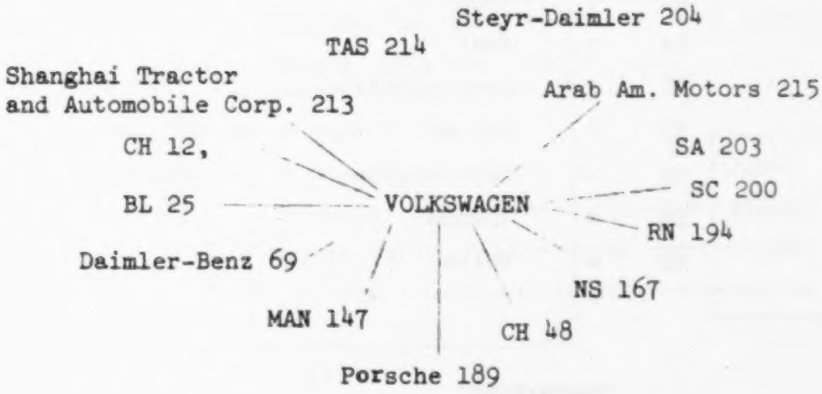

TK 168
IS 171
Motor Iberica 161
VW 167
AR 3
NISSAN
Hyderabad Allwyn 166
TO, PC, TK 163
Martin Marietta 165
Marubeni Corp. 164
Bendix, Toyota
IS, HINO 169


RN, Automotores
Franco-Chilena 184
RN 181, 182, 185
Thompson 180
RN, VO 183
Glaenzer-Sicer (GKN) 179
BL 28
Citroen 177, 187
CH 48
PIAGGIO 178
PEUGEOT
FI 84, 85, 90
Saab-Valmet 176
FD 102
RN 147
TK 186
HD 122
MATRA 156
Mahindra
Mahindra 143


OYAK-Renault 199
Wartburg 197
DACIA 198
Ransburg Corp. 196
Leyland Nigeria 27
VO 195
Bendix 16
VW 194
RENAULT
AMC 11,13
CHINESE No.2 193
FD 105
PC 181, 182
MACK TRUCKS 141
MATRA 174
MAN 149

SOURCE: Automotive Industry Data Ltd., Joint Ventures and Collaboration Agreements, February 1983.


UMW 210
Delhi Cloth and General Mills 211
DA 60, 61
China Steel Corp. 209
GM 108
TOYOTA
Bosch 170
HINO 119
LOTUS 137
Bendix, NS
IS, HINO 169
NS, PC, TK 163


Steyr-Daimler 204
TAS 214
Shanghai Tractor
and Automobile Corp. 213
Arab Am. Motors 215
CH 12,
SA 203
SC 200
BL 25
VOLKSWAGEN
RN 194
Daimler-Benz 69
NS 167
MAN 147
CH 48
Porsche 189

SOURCE: Automotive Industry Data Ltd., Joint Ventures and Collaboration Agreements, February 1983.

LIST OF ABBREVIATIONS

Vehicle Producers

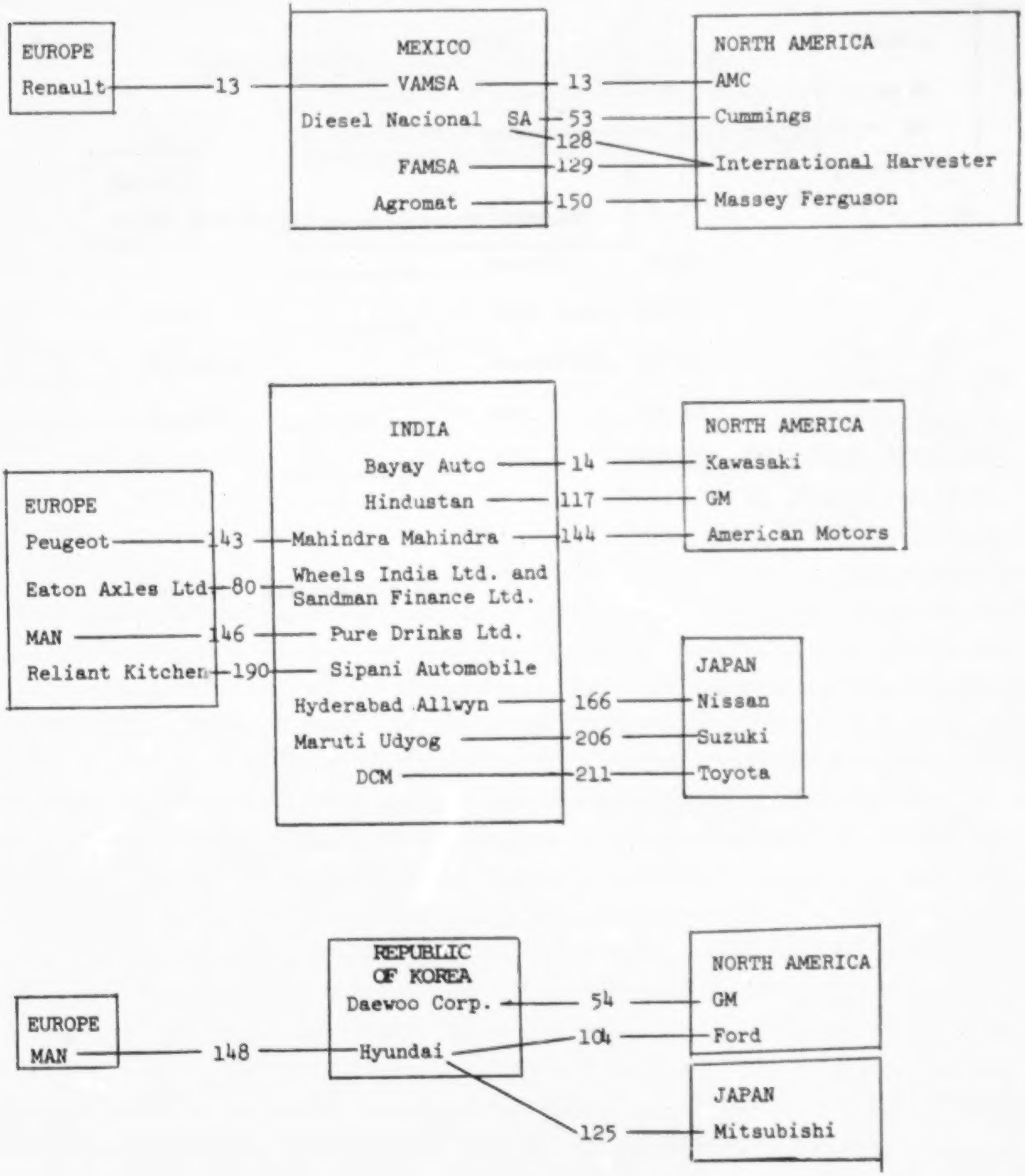
AR = Alfa Romeo
CH = Chrysler
DA = Daihatsu
FD = Ford
FI = Fiat
HD = Honda
IS = Isuzu
MI = Mitsubishi
NS = Nissan
PC = Peugeot
RN = Renault
SA = Seat
SC = Saab-Scania
SZ = Suzuki
TK = Toyo Kogyo
TO = Toyota
VO = Volvo

Components

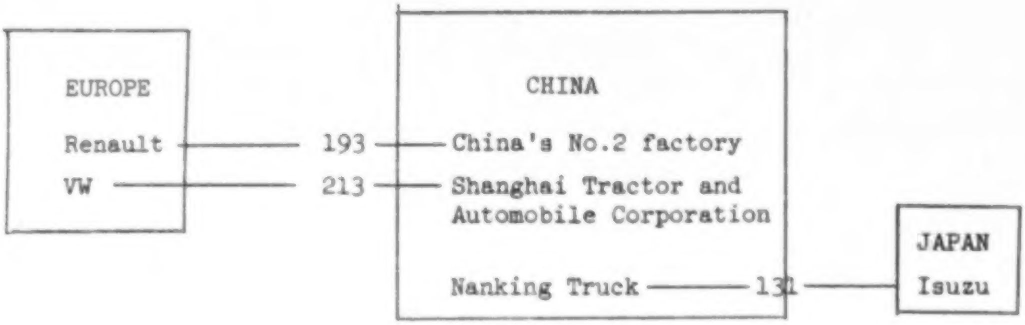
ZF = Zahnradfabrik

CHART 2

COLLABORATIONS IN SELECTED DEVELOPING COUNTRIES


EUROPE
Renault
13
MEXICO
VAMSA
Diesel Nacional SA
FAMSA
Agromat
13
53
128
129
150
NORTH AMERICA
AMC
Cummings
International Harvester
Massey Ferguson
INDIA
Bayay Auto
Hindustan
Mahindra Mahindra
Wheels India Ltd. and Sandman Finance Ltd.
Pure Drinks Ltd.
Sipani Automobile
Hyderabad Allwyn
Maruti Udyog
DCM
EUROPE
Peugeot
Eaton Axles Ltd
MAN
Reliant Kitchen
143
80
146
190
14
117
144
166
206
211
NORTH AMERICA
Kawasaki
GM
American Motors
JAPAN
Nissan
Suzuki
Toyota
REPUBLIC OF KOREA
Daewoo Corp.
Hyundai
EUROPE
MAN
148
54
104
125
NORTH AMERICA
GM
Ford
JAPAN
Mitsubishi

SOURCE: Automotive Industry Data Ltd., Joint Ventures and Collaboration Agreements, February 1983.


EUROPE
Renault
VW
193
213
CHINA
China's No.2 factory
Shanghai Tractor and Automobile Corporation
Nanking Truck
131
JAPAN
Isuzu

SOURCE: Automotive Industry Data Ltd., Joint Ventures and Collaboration Agreements, February 1983.

Table 10

Equity Ownership among Leading Vehicle TNC

Owner		Recipient	(% equity owned)
GM	→	Isuzu	(34.2)
	→	Suzuki	(5.3)
Ford	→	Toyo Kogyo	(25.0)
Chrysler	→	Mitsubishi	(15.0)
Renault	→	AMC	(46.4)
	→	Volvo	(20.0)

Source: Personal files

The French producers are intensively involved in collaboration. The Peugeot network covers links within Europe relating to Renault, Volvo, Saab Scania, BL and Matra while it also ties up with Chrysler and Ford among US producers and Toyo Kogyo and Honda among the Japanese. Renault has its major shareholding in American Motors but also has an important JV with a key components producer, Bendix, to produce automated equipment and has a similar linkage with Ransburg for similar purposes. The companies are engaged in several joint holdings in developing countries and are of course both influenced by French government behaviour with regard to internal collaboration in their home base.

VW's fairly wide contacts cover some important collaborations including that with Renault to manufacture a new type of automatic gearbox from plants supplied by each partner. Within FRG the company has strong ties to Porsche, MAN and Daimler-Benz as well as with other component producers. These links are aimed chiefly at the joint design of parts and of vehicles. In this respect the VW network more or less divides into two segments. One of these is the research and design part which is very heavily concentrated on collaboration with other German companies, while the other segment involves VW production abroad. Since, as noted earlier, the charts do not include the wholly-owned subsidiaries in developing countries, the rest of the developing country links are mainly for fairly small-scale local production.

Apart from these two main blocks the diagram indicates a couple of other dimensions of the evolving VW strategy. Item 203 relates to the VW co-operation agreement with Seat in Spain. That state-owned enterprise had been looking around for a partner ever since the formal end of its agreements with Fiat (which previously had a one-third shareholding in the company). VW has finally joined with Seat in a deal that will allow substantial Spanish production of a couple of main VW models in the period up to 1987. Part of that production will be for export and the estimated LC is of the order of 50-60%. Whether or not that move heralds a strong advance by VW into southern Europe is a still open question. The other interesting feature of the chart is the item 213 which signifies VW entry into the Chinese market. It is thought that this will be a JV with VW holding 50% of the shares and that full production under this scheme could begin by 1988. Both this and the Spanish move may signify that VW has selected the other areas apart from US and Latin America where it wishes to fix its long-term production operations.

Both Fiat and BL, but particularly the latter, are using collaboration as an important plank of their strategies. Traditionally Fiat has been strongly involved in component production in eastern Europe, and in attempts to strengthen a Latin American network. However the last of these has been greatly debilitated in recent years and the company is now striving to use collaboration mainly as a device for restructuring Italian industry and reinforcing its position in component production. BL is very much on the defensive and is certainly the weakest of the companies whose collaboration arrangements have been singled out on the charts. Its most important deal is with Honda, where joint production of the Acclaim model for UK and European markets has attracted considerable attention and no small degree of conflict with Fiat claiming that it is essentially a Japanese vehicle. Some BL deals are with component producers but on the whole the company is not attempting any serious moves in that direction. Along with Volvo, Fiat, Peugeot, Renault and VW the corporation is a member of the so-called Joint Research Committee whose function is to support the R and D of the member firms in such areas as combustion technology, computerized engineering methods and the properties of new materials. It is unclear as to what extent this Committee has produced work which is separate from that of the individual members.

The two leading Japanese firms appear to be very selective in the collaboration field. As noted before, Toyota is involved in a major JV with GM while Nissan is in collaboration with VW to cover production and marketing of models particularly within Japan. The two companies collaborate with each other as well as with Toyo Kogyo and Peugeot in South Africa and together with Bendix, Isuzu and Hino in a brake manufacturing company within Japan. Both of them have definite interests in strengthening their position in other markets - though up till now Nissan has advanced further via its ties to Alfa Romeo in Italy and the important truck producer Motor Ibérica in Spain. Their ties with component producers are oriented towards the US where Nissan, among other things, has an arrangement with Martin Marietta, an important producer in the aerospace business. At present it is difficult to discern the degree and direction which further co-operation by the Japanese leaders might cover.

The data on corporations have so far concentrated on the leaders. Examination of the material in the appendix, however, shows that some of the second-rank, large-scale producers as well as the specialist firms in the industry set considerable store by collaboration. Mitsubishi has recently been active within Asia acquiring a 10% stake in Hyundai as the basis for a massive expansion of capacity by that company in the Republic of Korea (an expansion all the more interesting because Hyundai is currently working at a capacity utilization rate not much above one-half) as well as a 30% share in the new joint deal with the Malaysian government to produce a so-called 'people's car'. Honda has likewise been active in international arrangements; but in its case, as can be seen from the BL example, the accords cover European countries as well as Asia. The general perspective of the second-rank and specialist producers is that collaboration is a way of life. Without it, there is practically no prospect either of developing external markets or indeed of surviving in domestic ones.

The data given for 4 important developing countries illustrate that, to a very important degree, they are marginalized from the mainstream of collaboration. This is no surprise when we remember that firms producing in developing countries are to a large extent affiliates of TNCs and that the number of independent advanced component producers is very small. In short, the TNCs do not see any advantages to be gained from collaboration of a detailed technical kind with Third World countries. The function of those countries in the system remains very much that of production bases and their contribution otherwise is scarcely taken into consideration (apart, of course, from their purchases of the vehicles). In fact the four countries shown really have almost all their collaborations in this production setting.

The information used here is confined to those instances where agreements have actually been reached. There have been many cases, however, where TNC have tried to set up collaboration but have failed. These failures have been particularly pronounced in relation to the largest TNCs, i.e., from the US, Japan and FRG; but some cases can also be detected among the smaller firms. The prevalence of failed arrangements is testimony to the strategic uncertainty which surrounds collaboration. Whenever joint design, research and production are at stake there is always the possibility that one firm will try to steal a march on its collaborators. That risk is always likely to hold back some of the possible agreements.

The charts and appendix data are more than enough to underline the fact that each firm has found it necessary to enter into a multiplicity of arrangements. This indicates that no firm can obtain all of what it wants from a single partner and that each seems to be probing the others to find the areas where their assets are strongest. Those assets may be technological, political or economic in character. Whichever the dimension, the prospective partners will try to exploit that. All the same it is noteworthy that the two leading US firms as well as the two Japanese leaders have adopted a relatively cautious approach towards collaboration. This indicates on the one hand the fact that they would consider most joint deals as being ones which could not yield them sufficient benefits in relation to their own inputs due to the asymmetry of power; and on the other hand that the risks of losing important steps forward are not that great.

To some extent the collaboration road is therefore one which offers a safety net, though one with some holes in it, to the weaker producers. It does not appear to represent the thin end of the wedge as far as future take-overs are concerned. Indeed, although Renault now owns 20% equity in Volvo's car business, there is little evidence to indicate that either here or elsewhere full scale take-overs will be engineered through collaboration. Instead those would arise most probably from direct bids.

Finally, it should be pointed out that most of the strategic positioning with regard to collaboration may well have now already been achieved and that therefore the intensity of future arrangements will be less than in the recent past. Some changes of partners are of course still possible.

Collaboration is one aspect of the internationalization response of TNCs. As we have seen it is the method which to a large extent keeps developing countries on the side; the same is not true of either off-shore sourcing or global integration and these two will be considered in the following sections.

C. Off-shore Sourcing

Although assembly line production has traditionally been the norm in the auto industry, the large volume of bought-in components is an indicator that the production process in its totality has always been susceptible to considerable partitioning. Table 11 indicates the extent of subcontracted production of major subassemblies and components in the US industry. The items fall into four main categories. To begin with the major subassemblies of axles, car bodies and engines in which the use of outside suppliers has thus far been relatively small. The second category comprises the remaining subassemblies in which there is more use of external firms; yet in no case do the vehicle manufacturers allow too much production outside of the firm. For the components, lubricants and tyres are entirely bought in while fasteners, exhaust systems, bearings and carburettors are also sourced to a major degree from outside the firm. Finally, the remaining components are all purchased to in more or less significant extent from external suppliers.

The suggestion would be that the opportunities for extended subcontracting fall into two areas: the possibility for moving some major subassemblies to outside the firm, and the prospects for increasing the proportion of external purchasing indicated by the third category of components above. Of course the identification of possibilities for outhouse production does not necessarily mean that such production would shift to developing countries. As will be seen later, the realistic prospects for foreign outsourcing are indeed less than Table 11 may seem to suggest.

The economies of scale from producing diverse parts vary. In what have up till now been the main stages of the process, i.e., body stamping, casting and forging, machining of castings, and assembly, the largest runs currently affect body stamping where the optimum scale is probably around 0.5 million units per annum whereas the smaller runs are with assembly where optimum plant size might be about 200 thousand units per annum. From the scale dimension also, therefore, the division of the production system by location and spezialiation is quite feasible. Each of these stages, moreover, varies according to both the quantity and skill level of labour employed. In short, firms have the chance to seek out those locations in which labour costs and productivity levels are the most satisfactory for them. Given that governments are now above all interested in obtaining foreign exchange from auto operations and increasing employment, it is also the case that TNCs can benefit enormously from subsidies. Hence, there is now a situation where TNCs have two incentives for expanding their sourcing abroad, one being the availability of cheap labour and the other government support.

Table 11

Inhouse and Subcontracted Production of Automotive Components in US

Item	Vehicle Manufacturers (%)	Outside Suppliers (%)
Major Subassemblies		
Axle	90	10
Body	90	10
Engine	90	10
Frame	80	20
Steering	70	30
Suspension	70	30
Transmission	70	30
Components		
Batteries	50	50
Bearings	30	70
Brakes	70	30
Bumpers	70	30
Carburettors	30	70
Electrical components	50	50
Emission Controls	60	40
Exhaust Systems	20	80
Fasteners	10	90
Lubricants	-	100
Seats	50	50
Shock Absorbers	60	40
Spark Plugs	50	50
Tyres	-	100
Trim	50	50
Wheels	40	60

Source: Scott Laing and Robert Rahn, Foreign Outsourcing by US Auto Manufacturers, Economist Intelligence Unit, Special Report 151, September 1983.

Offshore sourcing is now pursued very actively by the leading US firms. The data shown in Tables 12, 13 and 14 indicate the extent of existing agreements to supply US vehicle manufacturers with engines, transmissions, and various components from abroad in the period to 1985. The tables do not give actual trade flows but rather the maximum quantities which could be transacted if full capacity working and existing project schedules were adhered to. However, actual volumes are currently well below the figures shown. The Tables for engines and transmissions reveal a very strong preponderance of deals between affiliated companies; on the engine side, for instance, the only transactions in which the partners do not have equity holdings between themselves are the imports of Ford from BMW-Steyr and those of Chrysler from Talbot (and even in this case there was equity holding up until three or four years ago). All the trade in transmissions shown in Table 13 is among affiliated companies. On the components side the pattern is quite different and reflects both the variety of sources available and the fact that some of the components are items where appreciable, though incremental, technological change has been occuring.

The only developing countries which appear in the tables are Brazil and Mexico, and the bulk of their involvement relates to engine production. It is estimated that at the present time there are approximately $3 billion worth of imports of engines and transaxles into the US market with the majority of these coming from Mexico and Brazil. In this process the role of government subsidies has been critical and one observer has commented that "lower labour costs are not the primary factor leading auto makers to move facilities such as engine plants abroad"[1/] but to stress that subsidies have been the decisive consideration. The other firms producing in the US, - i.e., VW and Renault (via American Motors) - have also set up major component plants in Mexico and almost all of these are within at most 200 miles of the US border. In short, the offshore sourcing fits into the by now well known Mexican pattern of Maquiladora industries. GM, Ford and Chrysler all own such plants, with five of them in the hands of GM and two each for the other companies.

The impact of these shifts on component production within the US is not easy to judge. It has been suggested that "Detroit will go outside the US for 26% of its auto components by 1985 and 36% by 1990" [2/] and that employment in the domestic auto supplier business is likely to fall by some 20% in the

Table 12

Foreign Sourcing of Automotive Engines:

Existing Agreements[a] to Supply US Vehicle Manufacturers by 1985

Manufacturer	Type	Source	Volume ('000 units per annum)
GM	1.5 and 2.2 litre diesel	Isuzu (Japan)	300
	1.8 litre diesel	Isuzu (Japan)	50
	2 litre	Isuzu (Japan)	100
	1.8 litre	GM (Brazil)	250
	2.8 litre	GM (Mexico)	350
FORD	1.5 and 2.2 litre	Toyo Kogyo (Japan)	350
	2 litre	Toyo Kogyo (Japan)	100
	4 cylinder diesel	Toyo Kogyo (Japan)	150
	2.3 litre 4 cylinder	Ford (Brazil)	350
	2.3 litre 4 cylinder	Ford (Mexico)	300
	2.3 litre diesel	Mitsubishi (Japan)	75
	2 and 2.4 litre diesel	Peugeot (France)	200
	6 cylinder diesel	BMW/Steyr (Austria)	100
CHRYSLER	1.4 and 2.6 litre	Mitsubishi (Japan)	500
	2.2 litre	Chrysler (Mexico)	270
	1.6 litre	Talbot (UK)	250
	2 litre diesel	Peugeot (France)	100
AMC	1.4 litre	Renault (Mexico)	150
VW	1.6 and 1.7 litre diesel	VW (Mexico)	325
	1.7 litre	VW (Brazil)	125
NISSAN	na[b]	Nissan (Mexico)	180

Notes:

[a] The figures refer to plans and not actual trade each year. Current volumes are in most cases considerably below the planned quantities. The table excludes some outsourcing which has been prominent in recent years but does not at present continue e.g., Chrysler imports of 1.7 litre engines from VW (FRG) to meet demand for the former's OMNI/Horizon model. Honda and perhaps Toyota will also import engines to their US facilities in the future, probably in quantities of 150 and 200,000 respectively.

[b] Engine type not available.

Source: Industry data.

Table 13

Foreign Sourcing of Automotive Transmissions:

Existing Agreements to Supply US Vehicle Manufacturers by 1985

Manufacturer	Type	Source	Volume ('000 units per annum)
GM	5 speed FWD[a]	Isuzu (Japan)	150
		GM (France	250
Ford		Ford (France)	300
	Manual FWD	Toyo Kogyo (Japan)	1,100
	Automatic FWD	Toyo Kogyo (Japan)	500
AMC	FWD	Renault (Mexico)	150
VW	FWD	VW (FRG)	450

Notes:

[a] FWD signifies Front Wheel Drive.

Sources: Industry data.

Table 14

Foreign Sourcing of Various Automotive Components: Existing Agreements to Supply US Vehicle Manufacturers[a/]

Manufacturer	Component	Source	Volume ('000 units per year)
Ford	Aluminium Cylinder Heads	Fiat (Italy)	500
	Electronic Engine Control Devices	Toshiba (Japan)	100+
	Ball Joints	Musahi Seimibu (Japan)	1,000
Chrysler	Aluminium Cylinder Heads	Fiat (Italy)	800
	Constant Velocity Joints	Peugeot (France)	600
AMC	Powertrain items and others	Renault (Mexico and France)	na[b/]

Notes:

a/ Figures show current quantities.

b/ 'na' signifies 'not available'.

Sources: Industry data

period 1980-85. It has also been suggested that the balance of payments associated with this kind of trade is also likely to worsen considerably. Several estimates indicate that parts imports by US auto firms could reach levels such that trade deficits, as a percentage of auto production, could exceed 20% by 1990 and that the exports of parts manufactured in Mexico alone could, over the period 1982-85, amount to some $5.5 billion. It is in that kind of setting that the moves for greater LC in the US have occurred.

These estimates may, however, fail to take adequate account of the real cost advantages which can be derived from off-shore sourcing and, furthermore, fail to differentiate carefully between the possible locations for such production. To obtain a fuller quantitative picture Tables 15, 16 and 17 seek to spell out the manufacturing costs in the US (as of 1982) for some important subassemblies and components, calculate the comparative labour costs in a set of possible alternative production sites, and then evaluate the potential net savings of labour costs per item in each of the locations. These calculations suggest several findings (as summarized in Table 16). First, it seems that outsourcing of radiators would be more expensive than to produce them within the US since the labour content of total costs is quite small for this item and any savings would be outweight by transport costs. Secondly, for engine wiring harnesses the only profitable location would be Mexico. Thirdly, FRG would be much too costly for all items save transmissions and even in that case the cost reductions would only be minimal. Fourthly, taken as a whole Mexico is the location which offers the highest savings (or the least additions to cost) for every item. Finally, due to the very high labour productivity in Japan and the substantial transport costs from Brazil, the former location is pretty much as good as the latter whatever the item in question.

These calculations, tentative though they may be, suggest that the scope for profitable out-sourcing, and therefore the impacts on the US component industry, may be rather less than indicated by the estimates given above. This point becomes stronger when due weight is given to technological changes affecting both subassemblies and components; those shifts will be in the direction of reducing the total labour bill (cutbacks in numbers employed will outweigh any increases in wages for more highly skilled personnel) and thus of minimizing the labour savings. It seems, therefore, that although the components industry in the US is, as argued elsewhere in this study, undergoing dramatic change, outsourcing of components is not the most important reason for that change.

Table 15

Estimated US Manufacturing Costs of Selected Subassemblies and Components, Front Wheel Drive Cars, 1982 ($ per unit)

Item	Material Cost	Labour Costs	Other Charges	Total Cost
Engine	219.00	96.00	130.00	445.00
Transmission	20.00	59.00	60.00	139.00
Starter Motors	4.74	3.26	0.74	8.64
Radiators	9.96	1.44	0.43	11.83
Engine Wiring Harnesses	1.61	1.47	0.49	3.57

Sources: US Bureau of Labour Statistics, Industry Sources.

Table 16

Comparative Costs in the Automotive Industries of Selected Countries, 1982

Country	Wage[a] ($ per hour)	Productivity Index[b]	Relative Labour Cost[c]
US	19.37	1.00	1.00
FRG	12.89	1.10	0.61
Japan	7.24	1.40	0.27
Mexico	3.53	0.85	0.22
Brazil	3.66	0.80	0.24
Republic of Korea	1.95	0.90	0.11

Notes:

a/ Wage rates calculated on basis of data published by US Bureau of Labour: $ conversion at average 1982 exchange rates.

b/ Estimates by Economist Intelligence Unit (EIU).

c/ Relative labour cost in country X calculated as:

$$RLC_x = \frac{W_x \left(\frac{1}{Px}\right)}{19.37}$$ where W_x is the wage rate in country X and P_x is the productivity index.

For those countries where labour productivity is higher than in the US the relative labour cost in them is lower than the relative wage: where labour productivity is below the US, the converse holds.

Source: Scott Laing and Robert Rahn, Foreign Outsourcing by US Auto Manufacturers, Economist Intelligence Unit, Special Report No. 154, September 1983.

Table 17

Potential Net Savings of Labour Costs[a] for US Manufacturers through Outsourcing of Selected Items in Selected Countries, 1982 ($ per unit)

Item	Japan			FRG			Brazil			Mexico			Rep. of Korea		
	(1)[b]	(2)[b]	(3)[b]	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Engines	70.0	44.0	26.0	37.0	40.0	-3.0	73.0	48.0	25.0	75.0	22.0	53.0	n.a.	n.a.	n.a.
Transmissions	43.0	21.0	22.0	23.0	18.0	5.0	45.0	23.0	22.0	46.0	8.0	38.0	n.a.	n.a.	n.a.
Starter Motors	2.38	1.65	0.73	1.28	1.50	-0.12	2.48	1.87	0.61	2.54	0.97	1.57	2.90	1.65	1.25
Engine Wiring Harnesses	1.07	1.82	-0.75	n.a.	n.a.	n.a.	1.12	2.10	-0.98	1.15	0.59	0.56	1.31	1.75	-0.41
Radiators	1.05	3.48	-2.43	n.a.	n.a.	n.a.	1.09	3.98	-2.89	1.12	1.14	-0.02	1.28	3.50	-2.22

Notes:

[a] Saving of labour costs calculated by applying the relative labour cost ratios shown in Table 16 to the labour costs given for the respective items in Table 15. It is thus assumed that the same relative cost of labour would apply to manufacture of all items shown.

[b] For each country and item, column (1) indicates the labour cost saving, column (2) the shipping costs and column (3) the net saving derived by subtracting column (2) from column (1). Hence, in all cases where shipping costs exceed the labour cost saving it would be more costly to outsource than to obtain the item within the US; this is shown by a negative sign in the third column. The calculations refer to labour cost differentials only - they would equal total cost savings on the assumption that material costs and other changes (as shown in Table 15) were uniformly equal in other countries to these prevailing in the US.

n.a. = not available.

Sources: US Bureau of Labour Statistics, Industry sources and Tables 15 and 16.

The comments regarding balance of payments effects also need to be treated with care since it should not be imagined that countries in which outsourcing takes place will necessarily benefit. In this regard a distinction has to be made between Japan on the one side and Brazil and Mexico on the other. In the former case the high productivity levels, accompanied by the technical quality of production and the strength of the indigenous industry itself, combine to ensure that the Japanese government does not need to offer any subsidies to enterprises investing there. Hence trade with Japan could show a negative balance for the US without any losses for the Japanese public purse. In the two major Latin American countries, however, the picture is quite different. There the strongly negative impacts of the auto industry on the trade balance have driven the governments towards export promoting and investment encouraging policies. To implement those policies is by no means cheap and does not offer any guarantees that the trade balance will in fact show a steady and sustained improvement - implementation does, nevertheless, mean real costs to the government budget. In this case, then, even if the domestic components industry in the US were to be weakened, it would be incorrect to infer that the countries where component production was taking place were receiving many benefits.

The foreign sourcing is not confined to the US firms even though it is much more advanced in their case. For some years the leading European producers have been developing networks within the continent for intra-trade in components. At the same time the specialist producers source a very high proportion of their components outside their countries - though in this case the reasons are as much to do with availability of domestic supplies as with cheap labour. Thus Volvo purchases only 32% of its components within Sweden and the company has commented that "one explanation of the decline in the percentage of materials and components purchased from Sweden is the change that has taken place in the content of Volvo's products. Vehicles are becoming technically more complex being fitted with pumps and electronic components, for example. These parts are made by manufacturers in the big car producing countries and, notwithstanding several attempts, domestic production has not yet got underway. There is reason to expect that coming technical development will result in a growing proportion of foreign material in the products and that the technology content of these purchases will increase."[3/] Thus the drive towards external sourcing in effect comprises three elements, the search for cheap labour, the opportunity to benefit from government subsidies, and the fact that for the smaller producers there is insufficient domestic component capability.

So far the locations for such production have been very few. Unlike the kinds of behaviour which have been found in textile production and electronics, it is possible that these plants will not be especially footloose. The auto companies would probably prefer to maintain production of key components in the locations selected even if, as is very likely, the pay-back periods from such production are short. After all, the segmentation of trade and intra-trade circuits discussed earlier is reasonably stable and there is no evidence to show that the leading TNCs are ready to switch production locations at frequent intervals. One consequence of that state of affairs is that the conflicts over LC will remain acute among small groups of countries, but is unlikely to involve large numbers. None of this implies that the situation is particularly favourable for those developing countries which are selected, since the extent of subsidization given by them is very high. This point will be elaborated further in a subsequent chapter.

The off-shore sourcing game began in earnest with the arrangements between the US and Canada, crystallized in the 1965 auto pact. That pact in effect incorporated Canadian production into the US industry and by 1971 US firms controlled 80 per cent of auto part production in Canada. While in the early years following the pact US companies invested some $190 million (from 1966 to 1970), the recent transfers in the opposite direction have been enormous; from 1976 to 1980 Canadian subsidiaries transferred more than $1 billion to their US parents in the transport equipment sector, 90% of which is motor vehicles and parts. Now that the US companies have decided to concentrate South rather than North of the border, the collapse of the industry in Canada seems imminent.

The pact, which was after all one form of the kind of deals which developing countries have subsequently sought to obtain, was a bilateral arrangement which could not hope to contain corporations operating on an international basis. As the government of the province of Ontario has recently noted: "given the multilateral nature of our side of the auto pact, GM can bring its engines into Canada from Brazil, Ford from Mexico and Chrysler from Japan without paying duty, thereby paying no penalty in the Canadian market for its decision to shift critical engine capacity out of Ontario".[4] Indeed Canada now has a rapidly rising trade deficit in auto parts: "by the end of 1981, the value of parts and vehicles from Third

Countries had jumped from $200 million in 1978 to $1.4 billion".[5/] That, admittedly, is a case where the location off-shore has been shifted and it too is intimately tied with bilateral, subsidy type arrangements. The likelihood that this kind of shift will be repeated elsewhere does not seem high.

The use of foreign locations to produce key parts is, of course, a pivotal feature of any transnational production process. It is not the same, however, as an attempt to achieve global integration of production. That involves additional steps which are described in the following section.

D. Global Integration

Few concepts in the auto industry have aroused so much interest, and yet apparently disappeared from debate so quickly, as the idea of the world car. The world car is a specific form of the general notion of global integration of production. This is a stage further on from off-shore sourcing since it aims to do much more than simply find the profitable locations to produce particular parts of a vehicle. The world car perspective endeavours to unify design and engineering of vehicles, to centralize corporate planning, to try and homogenize consumption styles in different countries, and finally to concentrate production of each component in one or two key locations but to have multiple assembly points.

The world car approach has in fact been pushed by GM to cover the notion of a world truck as well. In 1981 roughly 18.7% of global sales by GM were in trucks and the company is now trying to co-ordinate engineering programmes in several countries using "direct data communication through a computer link-up and satellite"[6/] so as to economize on design and subsequent production. This is being accompanied by organizational changes inside the firm and in particular through the formation of a worldwide truck and bus group to handle overall planning for GM's operations in this area.

Despite the widespread adoption of the phrase world car it would in fact be much more accurate to talk about world components, since the real point of the exercise from the production angle was to try and have common components which could be used in several different cars. To put it bluntly, the corporations appear to have reckoned that as long as a car performed well consumers would not worry what was under the bonnet. Consequently, the cosmetic changes could be confined to car bodies, internal layout of the vehicle and so on. The pioneers in the strategy have been GM and Ford, partly because these are the firms with global reach as far as production is concerned, partly because they are used to handling a market where consumer preferences are fairly well established and stable, and partly because the spread of these corporations gave them strongly incentives to try and economize on their more skilled functions.

The rationale of the approach was clearly stated by GM's President who "points out that there is really no such thing as the world car. Local government regulations and LC requirements prevent any manufacturer from producing a true world car - that is an identical vehicle produced in many countries. An even greater road block is the customer whose tastes and preferences vary from country to country. But we can produce a worldwide family of cars that have similar external dimensions and significant elements of common design. This saves engineering and development duplication."[7]

In the same vein, the Chairman of Ford said that its world car project, the Erika, contained "more common brains than common parts".[8] That company emphasized that "the savings produced by world cars will come from design and engineering rather than from the cost advantages of producing a vast variety of components at huge volumes in large plants from where they would be shipped to several assembly points around the globe...the group reckons that by pooling its worldwide effort it has saved up to $150 million on engineering, tools, facilities and launching costs. In terms of human resources, Ford saved 15,000 engineering man years."[9]

These comments reveal, among other things, that whereas global integration of production involves the centralization of activities, off-shore sourcing implies decentralization. From the corporate angle both activities represent savings, the former of skilled staff and the latter in reductions of cost for less skilled labour. But to achieve either management reorganization is necessary and in particular highly advanced planning is a decisive asset. Why, given these possibilities, has global integration not proceeded further? Ford, for example, still continues to source some 95% of components for the Erika car within US and "it is obvious that many of the supposed advantages have not been fully realized. The level of commonality and interchangeability between the European and North American GM 'J' cars or the Ford Escort is extremely low" and thus there is "still considerable debate in the industry about whether the world car theory can be made to work better than it has in practice so far".[10/]

On the face of it the problem seems to rest with the inability to achieve the commonality of components. But it is not clear just why that objective has not been attained. The co-ordination among engineering groups was, by all accounts, pretty successful and it also seems incorrect to assert that LC regulations would have significantly interfered with the homogenization process (although they could pose more difficulties in the future). By the same token, transport costs are also not a problem. So the practical weakness up to now must be in the component area though, to repeat, it is unclear just why the commonality has not been achieved. Moreover, when one takes into account that GM only intends to produce 7 basic models worldwide in the next few years and that "the most popular model will be produced worldwide in more than 2 million units and the other models in at least 1 million units"[11/], then surely the incentives are still there. The tentative conclusion must therefore be that at the moment the two US giants have the elements of a global integration system in place but have decided not to press ahead with that until a somewhat later date.

Other TNC producers have not really made a serious effort to implement a world component approach. This is due to their fundamentally weaker situation on an international scale, as discussed earlier in this study. The Japanese firms have yet to make any attempt whatsoever in this direction, since they are after all not involved in significant foreign investment, while the European producers (essentially VW, Renault, and Peugeot) are operating with segmented systems in which the gains from seeking commonality would not at present be great. In any event these firms retain one strategic base for the design and engineering activities and that is in their home countries. The position for GM and Ford was different as they had already established, above all in the case of Ford, key locations in Europe where not only production but also more or less the full range of corporate functions were being undertaken. Consequently they do have economies to gain from pulling together disparate design and engineering teams whereas the same is not true of the European producers.

In conclusion it is worth emphasizing that the global integration approach does represent the logical culmination of a long term trend towards homogenization of consumption and production on a global scale. Therefore, the present hiatus in the elaboration of the strategies by the US firms in no way signifies their permanent abandonment. Rather, it may be expected that these approaches will be renewed at a more favourable time in the future. That does not, of course, argue that the other leading TNCs would be in a position to do the same. At the moment there is a severe imbalance comparing their strategic situation to that of the US companies. It would be necessary for those fundamental conditions to be changed before these other firms could go as far in integration as the US leaders contemplate.

E. An Assessment of the Internationalization Response

This chapter has focussed on three aspects of the external response to crisis by the auto firms, namely collaboration, off-shore sourcing and global integration. The main arguments advanced are summarized below:

(i) The international dimension of corporate behaviour was in at the creation for the two US leaders and has always been significant for VW, Renault, Peugeot and Fiat. The specialist car producers have likewise found it necessary to extend and strengthen foreign links.

(ii) In recent years clear differences in the strategic behaviour of the TNC are discernible. The Japanese firms rely very heavily on direct exports, the second rank among them are engaging fairly extensively in external collaboration, and there is a beginning to JVs by the leaders (although off-shore sourcing so far remains anathema to them).

(iii) GM and Ford in practice do not collaborate with other TNCs on project work. They have greatly intensified their external sourcing of parts with the accent almost entirely on Mexico and Brazil, to the detriment of Canada. With the exception of that country, their international approach consists mainly in the reinforcement of their traditional strongholds.

(iv) VW and Renault, both of which were originally established as national champions, are heavily involved externally via direct investment and collaboration. They do require joint project work with others; but again approach this cautiously with a strong accent on linkages with major component producers in their own countries. VW may have, by now, laid out the nodal points for its future global operations, with its activities at home, and in Brazil, Mexico and the US, now being supplemented by its tentative moves into Spain and China.

(v) The second rank European producers, Fiat and Peugeot, have limited involvement now in direct investment but each of them continues to emphasize its international orientation. In the case of Fiat this persists via its substantial links in eastern Europe, and in the case of Peugeot has come out most forcefully in its involvement in numerous collaboration agreements.

(vi) The firms which are weakest of the large scale vehicle producers are Chrysler and BL. They have, particularly the former, reined in their foreign investments and in fact sold off a high proportion of them. Chrysler is still engaged in a certain amount of off-shore sourcing concentrated in Mexico and to a far lesser extent in Japan, while BL relies heavily on foreign collaboration. Both of these firms are seriously limited in their prospects for continued survival.

(vii) The specialist car producers continue to thrive with their considerable skills in R and D and in design engineering, keeping them in the forefront. Collaboration for them is a fact of life.

(viii) The current period is one in which TNC are groping for the best ways to extend their global grip. Various false starts and downright blunders have been made yet no firm which pays scant attention to its international spread can expect to remain independent for very long. Each group must go international yet the way in which it does so and the instruments it uses vary significantly from case to case.

CHAPTER VI

SCENARIOS FROM THE CORPORATE OLIGOPOLY

A. The Technological Imperative

The auto industry is now in the throes of a technological upheaval. Table 18 offers an overview of the organizational and technological changes now underway in the industry and tries to indicate the time horizons in which they are likely to be realized as well as the likely cost savings and efficiency improvements associated with them. The categorization is obviously subjective and, as the notes to the table indicate, may not do full justice to the system advances consequent on various kinds of product and process improvements, or to the possibility of as yet unforseen technological changes. Nevertheless, the table does give a general picture of the kinds of reorganization affecting the industry and the possible consequences of them.

All mass producers as well as the leading specialists are introducing new production methods which are combining long runs with considerable versatility. Production structures are therefore beginning to converge even though the scales of production may differ substantially from one firm to another. The introduction of FMS drawing upon robots in the work place and CAD allows smaller and more mixed production lines to co-exist with outputs on a huge scale. In other words, although there is a convergence of methods, the scale differences between producers persist. Thus the future structure of the industry is likely to be one in which among the giant producers the field will be reduced still further, leaving perhaps 8 enterprises engaged in mass production, while specialist producers such as Volvo, Saab Scania, Porsche and Mercedes Benz continue to operate very effectively in their parts of the market. Yet, to emphasize, both sets of producers will be drawing upon and incorporating very similar technological inputs.

As these production transformations take place, more and more attention is likely to be devoted to the use of new materials in auto production. This dimension of the technological upheaval is one whose consequences are likely to be two-fold. First, older manufacturing methods may well be removed as, in particular, the possibilities of plastics begin to be exploited on a large scale. Secondly, and here comes the element of uncertainty, the new materials

Table 18

The Dimensions of Organizational and Technological Change in the Automotive Industry: Diffusion and Impact

Cost savings and efficiency improvements[b] / Objectives and methods \ Time Horizon[a]	Largely Achieved		Medium Term		Long Term	
	Major	Minor	Major	Minor	Major	Minor
System						
A. Domestic Supplier Reorganization						
1. Greater outhouse purchasing				X		
2. Reduction in no. of external suppliers		X				
3. Single (preferred) suppliers			X			
4. Long term contracts				X		
5. Quality control at entry			X			
6. Collaboration among vehicle and component producers			X			
B. Inventory Reorganization						
1. Logistics and planning			X			
2. Just in time systems		X				
C. Foreign Outsourcing of Components			X			
Product Design and Performance						
A. Computer Aided Design			X			
					X	
B. Reduction in Fuel Consumption						
1. New materials					X	
2. Improved Aerodynamism			X			
3. Optimised fuel injection		X				
C. Passenger Safety and Comfort						
1. Brake controls		X				
2. Navigational aids				X		
3. Mobile communication				X		
4. In-drive entertainment		X				
Production Process						
A. Raise Labour Productivity						
1. Reduce labour content	X					
2. Control Wages	X					
3. Quality circles		X				
B. Automation						
1. Playback and computerised robots	X					
2. Sensory and assembly robots					X	
3. Interacting computerised systems for design, production, inventory and finance					X	
4. Flexible manufacturing systems					X	

Notes: The classifications adopted are necessarily tentative and the judgements subjective. The following basic points need to be kept in mind:

(i) The industry as a whole is in a dramatic process of adjusting to new international norms which are themselves in a state of flux. In some cases, particularly supplier reorganization and inventory management on the system side and levels of labour content in the production process, the standards largely exist and have been set by Japanese practice. In many others, however, the frontiers are not dominated by any one set of producers;

(ii) The changes are not necessarily additive;

(iii) The total system impact of introducing many changes will certainly be greater than the sum of individual shifts, for what is at stake is a fresh way of viewing the automotive product and process, on the one hand, and a new conception of its inter-industry linkages on the other;

(iv) Most likely there will be other changes not at all covered by the table.

a/ 'Largely achieved' means as of now to the mid-1980s; 'medium term' covers to end decade and 'long term' the 1990s.

b/ The major/minor distinction is based on what estimates and guesstimates could be gleaned from industry sources.

Sources: Personal files.

may well bring in their wake alterations which themselves reduce the need for some of the process improvements now taking place. In other words the materials revolution could force still further changes in the production process of a kind which would render unnecessary even several of the tasks now being performed by robots. Consequently it is possible that not all of the technological shifts will complement each other; there could be some substitution among them.

It is here that the speed of change and the time dimensions of the structural reorganization come through most forcefully. The present automation and flexible manufacturing phase, following on the longer run problems which various enterprises have suffered, is likely to be the primary factor altering the industrial structure in the short run. Later the impact of some of the material changes and the real consequences of the greater flexibility now available to producers are likely to be the leading considerations. Taken together, these two forces suggest that the structural reorganization of the industry consequent on the technological shifts is likely to continue for some years yet.

Thus far, therefore, the central thrust of the technological changes has been to expunge labour from the production process and to alter the skill composition of the labour force which remains. Within corporations the requirements of planning both the plant changes and the integration among different plants have likewise led to sharp reductions in personnel as well as to considerable reorganization of functions. The area on which evidence is less clear is the involvement of the vehicle TNCs themselves in R and D activities. Taking a long-run perspective, the auto producers have done very little R- and most of the D has been confined to fairly marginal improvements. This appears to have altered in the past three or four years with much more attention devoted to serious elaboration of basic design and engineering. The most obvious feature has been the considerable success of the specialist enterprises who, to an increasing extent, appear to be functioning as technical consultants to the industry, rather in the way that chemical engineering firms developed from chemical producers but with the difference that this time the process experts are themselves evolving within and from independent vehicle producers.

Up till now the industry has conveniently been able to leave quite a lot of the R and D work to component producers who are not at all in the business of making cars. Whether this division of labour will continue in the future is an open question. On one side we have enterprises such as GM, Fiat and Renault who are important producers of components, along with VW which is a major producer of robots. There is now a further strategic choice confronting these enterprises. To what extent should they expand their component and equipment activities? Certainly these are sectors where the promise of growth is enormous and certainly well beyond anything on the horizon in the auto industry itself. Yet the structure of those sectors is altering very quickly as the financial requirements for expansion, including foreign investment, increase and as other large TNC who had previously not entered these areas stand poised to make large investments.

Given that the auto companies themselves are engaged in investment programmes which require so much capital, and that for the first time the US majors are forced to resort to significant external financing, the dangers of over extension from the financial as well as the technological angle cannot be gainsaid. Our suspicion is that in the near future large-scale in-house production will continue from those firms, mentioned above, which are already in the market but that their efforts to carve a niche in the international struggle for component sales will be limited. In saying this, it is of course necessary to distinguish a little between products. By and large the auto firms will not try to become huge sellers of micro electronics, and still less of materials such as plastics, but they will remain very active in the production of robots and other heavy equipment of which they themselves are major consumers.

B. The Supplier Industries

For decades the auto TNCs have occupied focal positions in the industrial structures of their countries of origin; more recently, they have often come to occupy similar positions in countries where they have invested heavily. In each case it has been the vehicle firms which have set the directions and pace for the supplier industries. The myriad firms selling to them are usually heavily dependent on the purchases of the vehicle TNCs for their livelihood and have thus remained susceptible to changes in policy from that sector. The technological storm is not one from which the suppliers can shelter and indeed several major component producers have no wish for shelter. For the new systemic requirements of the TNC, and in particular their objectives of drastically reducing system inventories and setting new quality standards, are bringing about a structural shift in the component sector which promises large returns for those producers who can weather the storm.

The decisive alterations are easy to summarize. First, most of the smaller and medium sized firms will find it extremely difficult to survive as significant sellers to the car industry. Secondly, where national vehicle producers are in a weak position then local component firms will be hard put to establish external contacts which will allow them to survive. By their nature the new criteria used by the non-Japanese TNCs define an ever closer relationship, geographically as well as technically, with supplier firms. Hence those who are located in declining producer areas are likely to have grave problems unless they completely relocate. Thirdly, collaborative arrangements between vehicle producers and suppliers are on the increase, above all in relation to electronics. These arrangements again tend to be concluded with the largest firms in the supply sector. Fourthly, as foreign investment locations for the leading vehicle producers have become firmly set, so these firms strive to reproduce in foreign countries exactly the same structure of inter-firm links which exist in the home base. In short the vehicle producers themselves encourage the selective internationalization of the component producers. Hence the auto industry becomes still more homogenized than in the past and the dreams of those who think of LC and integrated domestic structures fade into the distance.

While the remarks just made indicate various directions of structural reorganization, there are two important areas in which trends are not yet clear. The first of these follows from the comments in section A above; i.e., the difficulty of assessing how much in-house production will be undertaken by the auto firms themselves. Comments on that have already been made. The second conundrum is whether Japanese TNCs will invest abroad on a substantial scale and, if they do, whether the Kanban system can be vaccinated against international travel. Thus far the Japanese strength has resided very much in the system command whereby even higher proportions of components are bought in than is the case elsewhere, but they come from enterprises closely linked both geographically and technically (sometimes financially as well) with the vehicle producers. To some extent, a move by a Japanese producer without accompanying shifts by the rest of the system would be akin to leaving the house without clothes on. Important indications of the degree of international mobility of such a system are likely to be given by the evolution of the JV in the US between Toyota and GM, on the one hand, and the developments which take place in the Maruti-Suzuki collaboration in India.

These uncertainties imply another: i.e., the extent to which Japanese component firms will try to build up a strong international business. So far it is US and European companies which dominate international sales of components and a fair proportion of those sales follow well-trodden paths of collaboration between particular vehicle TNC and the component supplier concerned. If Japanese companies want to expand their sales then they have essentially two routes. One would be through sales to any Japanese TNC established abroad, while the other would depend on obtaining clients through taking away the markets currently held by the US and European enterprises. Thus the upheavals technologically and in terms of international production by the vehicle firms will be crucial factors in determining both the industrial structure and the international spread of the component sector.

C. Internationalization of Production

GM and Ford are the two corporations which have the long history of foreign production. Their bases in Europe have existed (with the exception of contemporary investments in Spain) for half a century while their presence in the big three Latin American countries goes back a good two decades. The European firms came into the picture much later and on a reduced scale. VW has the widest spread among them with its production bases in Brazil, Mexico and the US itself, while Renault and Fiat have less reach. The striking characteristic of the investment process is that the number of locations where large-scale production takes place has remained remarkably stable. The whole of Africa, with the limited exception of South Africa, much of Asia, a fair number of countries in Latin America, and even several of the smaller European countries are all off the map as far as production is concerned.

It is thus no surprise that the two US leaders have been very much the pace-setters in the recent phase of increased internationalization. It is they who are now radically changing the structure of the industry in Spain as well as its orientation towards exports via corporate intra-trade; it is they who have taken the lead in the use of Mexico as the major location for off-shore sourcing of components; and it is they again whose moves in Brazil have created competition for VW in that market. In the recent past, and in what seems likely to be the pattern of the next few years, practically no other TNCs will be able to match the strength of the US firms in these markets. When issues such as LC, export requirements and government subsidies to auto firms hit the headlines, there is a strong probability that the US producers will be those principally involved. The industry in this sense remains, as always, acutely imbalanced.

The one dimension in which these two firms have been reluctant to spread themselves concerns collaboration schemes with other vehicle producers. This too, however, is a reflection of their own perception of their strength. When they deal abroad it is with governments that need them as investors and locally established producers - it is not with other TNCs. This behaviour contrasts most sharply with that of the European firms who see advantages coming from project collaboration. Among them, of course, there are differences since VW also, being the third in line on the transnational ladder, prefers to set up production arrangements with either a weak national producer (Seat) or a government, while the French producers and Fiat have greater recourse to project linkages. In both cases - i.e., that of the US and of the European firms, there has been much more international spread than is so for the Japanese producers. Their actions have been, at least until the end of the last decade, very much oriented towards Asia and the Pacific Basin while it is only in the past three to four years that they have become intensively involved in negotiations in some European countries and the US.

The prospects for further internationalization can thus be presented under the following points. First, the US producers are unlikely to engage in any other significant fresh investments which would take them out of the areas they know well. Ford, which relies much more heavily on non-US production than does GM, is still involved in negotiations in Portugal and Mexico; but both places are squarely within its strategic vision. GM is concentrating on creating a dominant position in relation to Ford in these established areas. Secondly, there is no reason to suppose that these firms will suddenly begin a wave of collaboration with other auto TNCs. Thirdly, their links with Japanese producers are oriented primarily at controlling and securing some of the returns from Japanese sales in the US market itself. To a lesser extent GM and Ford will manage their equity holdings in second rank Japanese producers so as to increase their influence in Asian markets - though it is difficult to imagine that the Japanese hold there could be appreciably weakened in the short run.

Fourthly, the European producers seem to have their hands very much occupied with the foreign investments undertaken in recent years. Both VW and Renault have been finding the US market a very tough one and the former company has suffered heavy losses in its operations there. Furthermore, VW has also been the main victim of the acute crisis in Brazil. Fifthly, the other producers apart from Toyota and Nissan are finding the international spread too much for them. Peugeot is the company with the strongest involvement but it has been unable to turn itself into a key producer in any of its foreign locations. Fiat has suffered heavy losses in Argentina, has pulled out of Spain, and relies to a growing degree on its operations in eastern Europe which are, in any case, of the technical collaboration kind rather than investment. Sixthly, the weaker companies have been forced to rein in their international endeavours. All of this implies an industry whose global command is greater than ever, yet one where the handful of corporations have been able to maintain a firm grasp over the places where they will produce and what they will produce in them.

D. The Functions of States

Save for the very early years of the industry in the US and the UK, government involvement has always been significant. In the present period, however, the interrelations between TNC and governments are more intensive and wide-ranging than they have ever been in the past. In the OECD countries governments have traditionally performed some combination of the following three functions: ownership of enterprises, stimulator of industrial organization, and legislator. Nowadays these are being supplemented in several places by subsidies to the industry, either through direct cash injections or through favourable fiscal treatment, by support for R and D in supplier sectors as well as to the firms themselves, and by ever firmer interventions to guarantee industrial peace.

In developing countries the government role has always been one of subsidising foreign enterprises as well as domestic firms which had entered the industry, particularly in the component sector. But there the repeated difficulties with regard to foreign exchange have led governments, at more or less regular intervals, to introduce policy combinations of LC, export requirements, domestic market quotas and similar instruments in an endeavour to simultaneously guarantee that the industry will not create too many balance of payments burdens and ensure that there are some favourable domestic linkages.

These two main kinds of government behaviour are now even more in evidence than in the past. The international spread of the industry, coupled with the severe crisis facing virtually all DC on the foreign exchange front, have led to frenetic efforts to find ways around what seem to be impossible obstacles. But at no stage can the policy designs be taken independently of the TNC aims; indeed the position is being reversed with the initiative firmly in the hands of the corporations. Thus there is a global competition underway to attract the auto industry and to do this via establishing the conditions required by the firms with regard to the financial incentive package, cheap labour and industrial calm, and sufficiently flexible arrangements with regard to trade.

Although direct ownership by the state of auto producing firms has been a relatively rare occurrence in developing countries (though the Maruti-Suzuki deal does involve a JV between a government and a TNC), the similarities of the policy predicament in many OECD countries to the developing country situation are striking. Nowadays it is only the core producer countries, which can be counted on a few fingers, which have policy choices significantly different from the rest. Everywhere else governments are juggling with the kinds of measures indicated above in an effort to either attract more of the auto industry to their territory or to avoid losing too much of it. Either way there is fierce competition. Perhaps the difference between the OECD and the developing countries is that, to some extent, the regionalization of production and trade forces the OECD countries to compete among themselves while for the developing countries the battle is among them. It is, as will be seen later, particularly severe in Asia. The irony with this intergovernmental competition is that the advantages of having an auto industry domestically for countries which are not in the core of the system are becoming progressively harder to establish and of more uncertain duration. This in itself simply reinforces the bargaining strengh of the corporations such that the impression is sometimes left of governments fighting to obtain a production site without really being able to demonstrate why or how that site will contribute to the local economy.

Whatever the merits or otherwise of particular cases, the general perspective cannot be open to serious doubt. At the moment the crisis is more for countries and the labour force within them than for the TNC. The latter command the initiative in no uncertain terms and are able not merely to negotiate with great success over new deals but to progressively improve the position of ventures already established. In doing so the conditions for a new kind of relationship between corporations and states may gradually be established. Those conditions would involve the state relinquishing any kind of effective control (whether through equity holdings or otherwise) over the operations of vehicle producing companies located on their territories yet nevertheless offering increasing subsidies, directly and indirectly, to the world's leading TNCs in this field. The balance of transfers in a financial sense would be significantly in favour of the corporations, while the prospects for governments to build or support national champions would be strictly limited. Moreover, the industrial network which has, in the past, been built up around the auto firms and has implicitly represented the most serious long run argument for government strategic support no longer appears to be subject to much state control. Instead the reorganization process is in the hands of the vehicle firms themselves; and it seems that governments will have little control over the structures which emerge. Undoubtedly this trend has been strengthened substantially by the economic and social policies now being pursued, not only in the core producer countries but also in many others as well. Even so, the position taken in this report is that the underlying forces of oligopolistic development would in any case have pushed things in that direction.

E. The Overall Picture

The simultaneous presence of the tendencies described in the earlier sections of this chapter offer the following panorama in the coming years.

- Among the large-scale auto producers only six or seven will survive till the end of the decade;

- The specialist producers have a favourable future, including the possibility that they will develop even further into technical consultants, especially in design, for the rest of the industry (above all in Europe);

- Technologically, production methods are converging rapidly. The new methods have sufficient flexibility such that efficient large-scale producers and efficient small-scale ones can exist in the same business;

- The revolution in organization of the industry is leading the US and Europe to adopt Japanese practices;

- The dictates of internationalization are pushing the Japanese companies, however slowly and reluctantly, towards external involvement resembling US and European networks. In conjunction with the preceding point, this suggests that both production and consumption norms are now being homogenized on to standards quite different from the past. The US and European producers are becoming more Japanese with regard to production, the Japanese resemble more the US and European patterns with regard to consumption and internationalization;

- The investment of recent years has irreversibly removed labour from the production process;

- That same investment now means that significant over-capacity could develop in the next few years. If this happens, additional pressures will weigh on both the weaker TNC and on production locations regarded as marginal in the corporate scheme of things; and

- The crisis is much more serious for labour and States. For most of the corporations the crisis has been and is a real opportunity from which they can derive substantial long-term benefits.

CHAPTER VII

DEVELOPING COUNTRIES: THE CONTEMPORARY SITUATION

A. The Auto Industry in Developing Countries

On a global basis the involvement of developing countries in auto production is relatively small. In 1982 the share of developing countries in world passenger vehicle production was somewhat less than 5% and that output was heavily concentrated in the three leading Latin American countries plus the Republic of Korea and Yugoslavia. Approximately 30 developing countries are engaged in some kind of production under license, while if we add the number of locations where assembly activities, however modest, are undertaken then the total number of developing countries with a production interest amounts to about 50. But, to repeat: the critical countries are few in number. Table 19 maps the actual and planned operations of 13 leading TNCs in 18 developing countries, and provides a basis for assessing the strategic focus of these corporations and thus the context in which developing country-TNC relations are developing.

The table has several clear features:
First, the US firms are heavily concentrated in the main Latin American countries through possession of subsidiaries, mainly fully owned.

Second, the positioning of the US companies in Asia can be looked at from two angles. On the one side their own direct involvement, which is in Republic of Korea and Philippines for GM, and Taiwan and Philippines for Ford; and on the other the placing of the Japanese firms which have equity links with them. This latter aspect is of growing significance. Ford's partner is Toyo Kogyo and it is involved in Republic of Korea, Thailand and Malaysia, all countries where Ford itself does not have direct operations. GM is associated with Isuzu and that company has dealings in the three countries just mentioned as well as in Indonesia - here again, where Isuzu is present, GM does not have direct equity holdings. To the extent, therefore, that GM and Ford are genuinely moulding the foreign penetration policies of their Japanese associates, a fairly articulated division of market placement can be observed among the companies.

Table 19

Actual and Planned Operations of Selected TNC in Selected Developing Countries, 1983

TNC DC	GM	Ford	Chrysler	VW	Renault	PSA	Fiat	Toyota	Nissan	Toyo Kogyo	Mitsubishi	Honda	Isuzu
A S I A													
Rep. of Korea	JP									JP	JP		
China				NJP[a]									
Prov. of Taiwan		JA			CLA			CJP[b]			JA	JA, LA	JA
India													
Thailand				JA		NJA[c]		SA, LA	JA	JA	SA		JA
Malaysia						JA	LA	LA	JA	JA	CJP[d]	JA	LA
Philippines[e]	JP[f]	JP						LA	JP		JP		JP[f]
Indonesia				JA				JA			JA	LA	LA
Turkey													
L A T I N A M E R I K A													
Mexico[g]	SP	SP(NSP)[i]	SP	SP	JP(NSP)[i]				SP	(NSP)[h]			
Brazil	SP	SP		SP[j]			SP[k]	SP					
Argentina		SP		SP	SP	JP	JP						
Venezuela	SA	SA		JA	JA		SA	LA					
Peru								SA	SA				
Colombia	SA				JA		JA						
A F R I C A													
Egypt	CJA[l]				CJA[m]		LA						
Nigeria	NJA[n]			JA									NJA[n]
Algeria	NJA[o]												

Key:
J = Joint venture, i.e., the TNC holds 50% or less of the equity capital.
S = Subsidiary, i.e., the TNC holds a strict majority of the equity capital.
L = License given by the TNC to a local firm; no TNC equity participation.
P = Production
A = Assembly
C = Plant under construction
N = Project under negotiation

Letter combinations are to be read as is: thus JP signifies a joint venture engaged in production. When two letter combinations appear in a cell, both kinds of arrangements exist.

Notes:

a/ Press reports as of October 1983 indicate that negotiations for the project should be completed in early 1984. Production of the VW Santana model at the Shanghai No. 2 factory may commence in 1987/88.

b/ Classified as CJP since negotiations seem to have been concluded for the joint venture in which China Steel, a public company, and local private capital are associated with Toyota.

c/ Discussions are still under way. Classification includes 'A' since, although it is claimed LC will eventually reach 73%, that target is a long way off.

d/ Agreements were signed on April 1973. The joint venture involves 70% equity ownership by Hicom, the public sector iron and steel company. The classification as 'P' is because by 1985, the body stamping plant is scheduled to be in operation, appreciably increasing LC.

e/ At the time of writing, the 'streamlining' of the producers from 5 to 2 is still under negotiation.

f/ GM holds 60% and Isuzu 40% of the same company.

g/ The decree on restructuring of the industry, promulgated in September 1983, has yet to be implemented at the time of writing.

h/ Discussions for a new project in which Ford and Toyo Kogyo would cooperate are still in an early phase. It is thought that vehicle design would come from the Japanese TNC but that equity ownership may be confined to Ford.

i/ According to arrangements concluded in August 1983, the Mexican government will sell out its interest in Renault de Mexico to the French TNC. That transaction raises Renault shareholding from 40% to 92%. Renault is also buying out the government stake (60%) in Vehicules Automobiles Mexicanos (VAM) along with the 6% held by AMC, by now a virtual affiliate of Renault - these moves push Renault holding in VAM to 95%. Plans are on hand for Renault to build a car engine plant in Mexico, to come on stream in 1985-86; the rest of the Renault investment would be around $100 mn.

j/ Press reports as of November 1983 indicate VW plans additional investments in Brazil of $800 mn. over the period 1984-87. A new family of small cars, entirely designed and manufactured in Brazil, would be aimed at the European market as well as Brazil itself.

k/ In August 1983 Fiat announced a $170 mn equity increase in its two Brazilian subsidiaries. The State government of Minas Gerais, Fiat's partner in the two companies, will not be increasing its stake; hence its equity holdings in Fiat Automotives and FBM will fall to 20% and 10% respectively.

l/ The project has been long delayed.

m/ Agreement reached in October 1983.

n/ GM and Isuzu each to hold 15% of the new company.

o/ Still at proposal stage.

Source: International Metal Workers Federation, Nissan Motor Company, Personal files.

Third, only GM has so far begun to take up strategic options in Africa and the Arab world; although these deals are in some cases still under discussion, it does appear that the US leader is starting to acquire a more powerful presence in Africa than has Ford.

Fourth, the Japanese TNCs are firmly situated in Asia, especially in ASEAN, but also in the Republic of Korea and Province of Taiwan. At the moment many of these activities have assembly character and often are of the JV or even license kind.

Fifth, Mitsubishi has been particularly aggressive in recent years, especially with its 30% involvement in Proton, the JV in Malaysia aimed at production of a national vehicle, and its purchase of 10% of Hyundai shares in the Republic of Korea. Although Mitsubishi is still only around the 9% mark in terms of domestic market share in Japan (and is thus the fifth ranked producer in that country) it does appear that the company is devoting great attention to the elaboration of an Asia strategy. It is noteworthy that the company has no presence in either Latin America or Africa.

Sixth, Toyota and Nissan, by far the two largest Japanese TNCs, are oriented mainly towards Thailand, Malaysia and Philippines in Asia (with the important exception of Toyota's JV in the Province of Taiwan) but are now trying to break into the Latin American area through focus on Brazil (Toyota), Mexico (Nissan), and the ANDEAN region. These advances should be seen in conjunction with the investments made by the same firms in the US itself. It would appear that enterprises with important interests in the US also elaborate strategies in the main Latin American markets which co-ordinate with their US policies.

Seventh, The European producers do not have the same strength of international presence in DC save for the heavy involvement of VW in the main Latin American countries. In that case also the focus has been on building up subsidiaries, and on progressively seeking to dominate local markets (in which VW has only been partially successful) and integrating component production in Latin America with the US operation.

The focus of large-scale production in a few countries implies that it is in them where the significance of the auto sector in industry as a whole is likely to be greatest. For the three largest Latin American countries, Brazil, Mexico and Argentina, data for the end-1970s indicate that the industry accounted for roughly 10% of industrial value-added with the extent of LC going from approximately 80% in Brazil and Argentina to about 60% in Mexico. The significance of the sector as an employer is less easy to establish but rough estimates suggest that it accounts for somewhat less than one in ten of the industrial labour force; some calculations for Venezuela in 1975 put the percentage, including direct and indirect labour, at about 7.5%. Outside of Latin America the weight of the auto industry is almost certainly less.

The structure of the auto industry and the parts sector has altered significantly in recent years, both of them being subject to growing concentration and denationalization. Again referring to the situation of the leading three Latin American countries, the position of the parts industry has been summarized as follows: "In Argentina, according to information from the terminal firms themselves, 80% of their purchases of parts in the domestic market come from the 250 largest suppliers. Moreover, within that group concentration is appreciable: 50 firms account for three-quarters of the market and 15 together reach 50% of the purchases. In the majority of these there is transnational participation. On the other hand, 12% of the total purchases of parts by the vehicle producers came from firms controlled by them or from transactions among them.

The phenomenon is repeated in Brazil; the transnational firms are among the largest producers of parts, and are the principal suppliers to the vehicle producers. Furthermore, one of the methods that the vehicle firms use to increase their control among suppliers is their equity holding in parts producers, as occurs with VW, Daimler-Benz, Ford and Fiat. An inquiry on this showed that at least 15 of the main products required by the vehicle industry had been so verticalized. In Mexico the circuit of transnational participation is made up of firms supplying parts for original equipment which have foreign participation and supply around 45% of the total demand. Of the ten chief firms, 8 have equity participation from the US."[1/] Table 20 shows the foreign involvement in the top ten component manfacturers in Mexico as of the beginning of this decade. In the same tenor, data for 1975 in Mexico

Table 20

Foreign Penetration of the 10 Leading Automotive Component Manufacturers in Mexico, 1980

Mexican Company	Products	Foreign Firm
Transmisiones y Equipos Mecánicos (Tremec)	Transmissions and Gearboxes	Clark
Motores Perkins	Diesel Engines	Perkins Engines
Eaton Manufacturera	Axles	Eaton Corporation
Motores y Refacciones	Pistons and Valves	TRW
Metalsa	Stampings	A.O. Smith
Bendix Mexicana	Brakes and Parts	Bendix Corporation
Cummins de México	Diesel Engines	Cummins Engine Company
Automagneto	Starter Motors and Electrical Equipment	Robert Bosch
Automanufacturas	Cast Discs for Brakes	Budd Company
Gonher de México	Oil Filters	

Notes:

Firms are listed in order of their 1980 sales. For Gonher a foreign affiliation could not be traced.

Sources: Asociación Mexicana de la Industria Automotriz: Dirección General de Estadística.

showed that fewer than 2% of the parts suppliers accounted for more than 80% of exports, and of that 2% (10 firms) at least six and probably nine had substantial foreign equity participation. In Venezuela the parts industry is likewise quite concentrated and there the principal firms either have equity participation by US parts producers or have licence arrangements with them.

The structure of the industry emanating from this kind of foreign involvement is shown in Table 21, which gives the share of foreign firms in vehicle production in Latin America in 1978, and Table 22 which gives the extent of concentration in the Latin American industry. Subsequent data for 1980 suggest the TNC share was virtually 100% in all three countries. Hence the present situation is one where the vehicle producers are entirely in foreign hands and where, over the past decade, the denationalization and concentration of the parts industry have proceeded very rapidly. These figures demonstrate that negotiations about the structure of the auto industry are thus to an overwhelming degree now between the governments and foreign producers; the influence of domestic groups on the production side comes from the parts sector but its influence is substantially weaker than it used to be.

This last point, all the same, needs to be interpreted carefully. Although the domestic shareholding in the leading parts firms is not what it was, the involvement of domestic groups with the TNCs is still of great importance to the latter. The reason is simply that the elaboration of policies brings together domestic political and economic interests with those of the TNCs. If the local policy-makers also have interests in the development of the industry along lines favourable to the strategic requirements of the large corporations, then it should be so much easier to reach formulations which match those requirements. For this reason it seems unlikely that the denationalization process would be pushed, in the parts sector, to a point where local interests were too small to give them the political incentive needed.

The position in the Latin American leaders is the outcome of roughly a quarter of a century of policy changes and ever increasing foreign involvement. Those countries, especially Brazil and Mexico, have now reached the point at which they are firmly incorporated into the transnational network. But for the rest of Latin America, as well as for almost all other

Table 21

Foreign firms' share of vehicle production in Latin America, 1978

	Majority-Foreign Owned	Minority-Foreign Owned	Nationally Owned
Argentina	95.4	—	4.6
Brazil	99.7	—	0.3
Chile	85.7	14.3	—
Colombia	45.0	55.0	—
Mexico	86.0	9.9	4.1
Peru	75.0	25.0	—
Venezuela	77.9	22.1	—
Uruguay*	41.8	—	58.2

Note: * 1977

Source: United Nations Centre on Transnational Corporations.

Table 22

Concentration in the Latin American auto industry, 1970

	Cars		CVs	
	4-firm concentration	No. of firms	4-firm concentration	No. of firms
Argentina	88	5	91	9
Brazil	99	9	88	11
Chile	100	4	100	1
Colombia	100	3	100	2
Mexico	80	7	76	12
Peru	100	3	100	4
Venezuela	83	8	97	8

Source: Calculated by United Nations Centre on Transnational Corporations from Automobile International, World Automotive Market, 1981.

developing countries, the position is quite different. Those countries remain with auto sectors which are characterized by the proliferation of models and manufacturers, all operating at extremely low production levels and behind tariff walls which at present the TNCs are probably not too worried about.

Strategically, the reorganization of the industry described in earlier chapters strongly suggests that the producer firms have no wish to further extend their production activities. From their perspective the best that can happen in these other markets is, quite simply, very little. It follows that their behaviour will be directed at retaining their positions within the markets, just in case any unexpected developments did occur, at using those positions to reinforce ties with local groups influential both politically and economically, and in general contriving to ensure that no radical policy changes take place. To put this a different way: the status quo in the overwhelming majority of developing countries is, for the time being, more than acceptable to the auto TNCs. They have rather few sunk assets in those countries, have no wish to sink any others, but are concerned that the conditions of oligopolistic competition should not swing strongly in favour of any one among them - for that reason those already present want to remain. This explains why a streamlining and denationalization of both vehicle and parts production is so difficult to carry out.

The one exception to this situation may be India. That country has had a virtually stagnant auto business for the past two decades but now seems to be interested in extending foreign involvement in the industry and in trying to boost demand inside the domestic market. That will automatically lead to the beginning of denationalization of vehicle production and might well involve a similar process in component production. To the extent that India were to move along the Latin American route then we would expect the same processes of concentration and loss of domestic control to take over. The difficulty at present is to judge just how far production in India is likely to go.

The comments thus far have centred on the structural features of the industry in the small number of significant producing developing countries. But of great importance also at the present time is the impact of the crisis on domestic sales, production and employment. It must never be forgotten that in developing countries there is necessarily a permanent strangulation of demand for passenger vehicles due to the acutely unequal income distribution necessary to stimulate their purchase in poor countries. As has been remarked in the Latin American context: "It is probable that in the future there will be an even greater accentuation of the tendency for the auto sector to become a replacement market, as it becomes ever more difficult to incorporate new income groups to consumption"[2/]. Similarly, and in more general terms, "because the existence of a wealthy strata is necessary to support an auto industry, any expectation that the auto industry will pace growth induces a bias against any significant efforts at income redistribution"[3/]. These observations go to the root of the marketing problem for the industry in developing countries.

Forecasts regularly indicate that developing countries represent the growth opportunity for the auto industry. But just as regularly such forecasts seem to ignore the fundamental contradiction arising from the huge and still increasing inequalities in income and wealth, the slow-down in income growth rates throughout developing countries, the foreign exchange crisis which has left all of them in a position where imports of private cars are unlikely to be stimulated, the controls on government expenditure which are bound to reduce public purchases of vehicles, and the burden, both public and private, of petroleum costs which still affects consumption patterns notwithstanding the recent reductions of petroleum prices. Our position, therefore, is that the predictions of substantial growth of sales in developing countries, predictions which in some cases have gone as far as to suggest that although developing countries account for roughly 10% of world car demand at present this could rise to some 30% by the end of the decade with around 50% for utility vehicles, are highly questionable. They do not take anything like enough consideration of either the fundamental internal distribution limits to expansion nor of the cronic exchange crisis which all developing countries save a few petroleum producers in the Arab world are now afflicted by.

Thus, as one of the preceeding citations indicates, it is by no means improbable that sales in developing countries also acquire something of the replacement market characteristics. In this regard recent projections by the OECD are of interest. They point to growth rates of auto demand in the present decade at 5.8% for Latin America, 4.3% for Asia and 6.6% for Africa, but with reductions in growth in all three regions for the decade 1990-2000 to

5.1%, 2.2% and 3.5% respectively. Moreover, these same forecasts note that "by 1990, replacement demand will constitute 71% of total world demand, compared to 58% now, rising to 76% by the end of the century"[4/]. What does this much less optimistic perspective on vehicles sales in developing countries imply about production in them? Our view is that still more of output in the main locations will be directed to export, and particularly to markets in the OECD area.

As an example of what may be the trend some Brazilian figures are revealing. In 1981 domestic sales of cars were 41% below the 1980 level. Yet exports increased by 36% but within those exports the appreciable share which had previously been going to other developing countries (for example Nigeria) was falling very quickly. Under these conditions domestic employment in developing countries may well drop in a catastrophic fashion, particularly if the constraints on sales are compounded by the introduction of some of the technological changes described earlier in this report. Taken together, these considerations point to a still more outward orientation of an industry which might well have passed its peak in terms of internal integration.

Previous comments in this study have emphasized the extent of investment which has been taking place in the major developing countries locations through this period of crisis. "Despite discouraging prospects at home and uncertainty about when foreign markets will begin to recover, the major manufacturers are continuing to invest in Brazil. Their main emphasis is to draw Brazilian production into the growing interationalization of their operations. GM of Brazil has invested $500 million in its Sao Jose Dos Campos Plant, which is making engines for the Monza. The plant is to export engines to the US and FRG, and later possibly to South Africa and Venezuela. The Ford-Brazil world car programme is costing the company $350 million in local investment. The Escort will be introduced in Brazil in mid-83. Fiat is also planning Brazilian participation in the production of a world car"[5/].

Similarly with regard to Mexico it has been remarked that "companies are not cutting their expansion plans, because they are so far advanced that to cancel them would mean major losses. Companies also believe that the Mexican market still holds great potential if that country can pull itself out of this crisis"[6/]. Hence we have growing investment and rapidly falling employment, falling sales and expanding exports, growing concentration and ever less national control. It is against this panorama that the policy framework must be considered.

B. Promotional Policies - The End of the Road?

It has cost the Latin American countries heavily to come into the auto field. More than 25 years ago, in 1956, there were the first laws in Latin America for local sourcing but these were at the same time as a very liberal policy towards foreign investment was instituted in the same countries. The subsidy element to the industry was enormous: "the fiscal and exchange measures alone were estimated to provide 89 cents in subsidies for each dollar invested in the industry between 1956 and 1960"[7/] according to calculations for Brazil. No auto TNC with any pretensions wanted to be left out of such markets, especially when the foreign investment framework allowed such easy and cheap access. In Argentina, for example, following the 1959 decree instituting a promotional policy frame for the industry, "in the case of GM, the parent firm made no cash contribution at all, relying entirely on the reinvestment of locally earned profits ($6 million) and used equipment from Detroit (capitalized at $14 million) to finance its $20 million investment"[8/]. Ever since then the history of the industry has been one of recurrent foreign exchange crises, constant interruptions and even regressions in moves towards greater LC, with the underlying trend towards more external bias and the gradual removal of domestic producers.

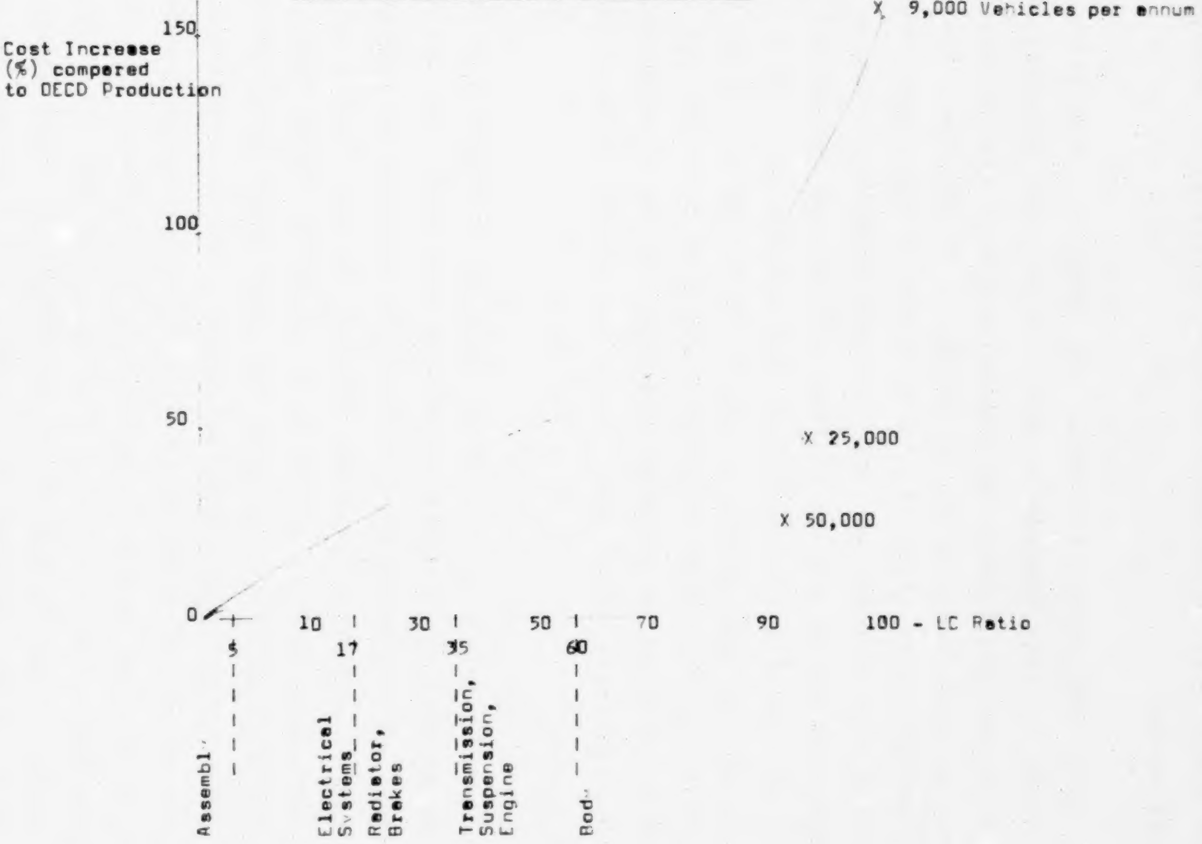
The Latin American story has been repeated though on a much less dramatic scale in some of the Asian countries and it will be shown later how they are now trying to grapple with problems in the same way that was attempted on various occasions in Latin America. Essentially the policy road can be described in simple terms. Beginning with the late 1950s, there was a strong push for import substitution. The auto sector was implicitly, though not usually explicitly, treated as a strategic centre for industrial growth and calendars were established for increases in LC. These policies, of which an integral part was the highly favourable treatment of foreign investment, led in the first years to a rapid increase in the number of locally established manufacturers and models. Domestic vehicle prices were high compared to levels prevailing in the US and production runs were well below the figures normally recorded in that market. Towards the end of the 1960s, and in some cases rather earlier, the emphasis switched towards the sector as a possible foreign exchange earner. But exports could only come from the TNC producers, given their command over international markets. To encourage them towards an external orientation, new incentives were provided, including cash subsidies, tax rebates and the possibility to operate with lower levels of LC in exchange for higher levels of export.

Thus at that point the idea of trading off domestic integration for foreign exchange began to take precedence over the original internal aims. This switch once more involved substantial subsidization of the industry and started the process of denationalization in earnest. At the same time the idea that domestic market quotas could be used as a way of encouraging exports still further began to take hold and was practised particularly in Mexico. By the end of the 1970s this policy too was hoisted with its own petard and once more the countries were faced with the foreign exchange stranglehold and the virtual ceilings of LC. At this point, and by no means for the first time, the requirements of the international industry appeared to coincide with those of the countries as a new phase of off-shore sourcing and the establishment of international production bases was begun. It is that phase which dominates the current scene.

The policy dilemma is that of a foreign exchange treadmill, on which countries appear to do well for a short period but then drop back again and have to seek new ways of continuing the climb. Along the way the apparently clear cut objectives of promoting internal integration and developing some export capability have been lost in a welter of technical difficulties and, more importantly, profound structural changes. As local integration advanced, so the costs of each step forward have spiralled. Chart 3 sketches the relation between the extent of local integration (LC), volume of production and cost increases in relation to figures observed in OECD plants. The higher the volume of production, the better the rise in costs can be contained. Indeed the chart hints at the possibility of DC production costs being down quite close to OECD levels provided sufficiently scale output could be maintained. The problem is that, in the overwhelming majority of cases, such output scales have not been forthcoming and are unlikely to be. Moreover, foreign producers have surrounded the LC process with all kinds of detailed points, of which the best known is the so-called deletion problem, i.e., whenever a part is removed from a kit sent from abroad, the cost of the total package only seems to drop by a small proportion of the value of the deleted part.[9/]

Chart 3

Approximate Relation between Extent of Local Integration, Volume of Production and Cost Increase



Notes: In the LC percentage ranges marked on the horizontal axis the kinds of local activity at each step are indicated. Both these ranges and the extent of cost increase are orders of magnitude only. Precite curves would differ according to the specific models, the length of time for which they have been produced in the DC (as a proxy for familiarity with the production technology) and the efficiency of operation of component suppliers as well as the vehicle producer.

Source: Based on R. Sekely, Transnationalisation of the Automobile Industry, University of Ottowa Press, 1981.

The structural changes can be summarized as the denationalization process in the parts sector. Nowadays it is necessary to distinguish sharply between nominal and real levels of LC. Thus an analysis in Peru shows how the 1969 legislation which set LC at a target of 70% for 1973 was repealed in 1972 to allow the inclusion of all inputs in Peru as LC which "in fact makes LC requirements next to useless as a policy tool: in Peru, 95% of tyre producers and 54% of components suppliers' raw materials are imported"[10/]. In fact Volvo estimates that for its trucks the nominal LC stands at 50% but the real LC is only 30%. The emphasis on LC has never been simply a question of quantity; it is not just a specific percentage of parts which should be produced domestically, but a question of choosing which parts to manufacture. In this respect the situation of developing countries is again, as in the past, at a point where the changed organization of production in the core countries is likely to put the LC prospects further backward. The use of new components and new processes will, to the extent that they are introduced in DC, provide a strong technical argument for reductions in LC. It will continue to be that moving target which is never hit. Developing countries, given the foreign exchange crisis and the interest in promoting exports, may find it very difficult to resist the pressures for this reduction in domestic integration.

The picture just sketched is a pessimistic one. But we believe that the historical experience of the industry and the present radical changes both militate against optimism. Over the long run no developing country, except the Republic of Korea, has seriously pursued a strategy of creating a national champion. Though the sector has frequently been accorded a key role in industrial development, that has rarely been accompanied by significant efforts of governments to elaborate and implement a strategy for capturing technological command in the sector. Given that there was a long period in which technological change was not particularly rapid, but that this period has now gone, the impression must be that developing countries have missed the boat. Certainly learning has taken place (if that were not so, then LC levels would not have reached the points they did); but that must be distinguished from obtaining the core technologies in the sector. Substantial outlays to support the growth of the sector have been made over a long time period yet the balance of costs and benefits seems no more adequate today than one or two decades ago. Moreover, the international oligopoly has grown incomparably stronger in that time.

As things now stand, therefore, we are before a Third World which has been partitioned. The majority of countries are either simply importers or marginal assemblers. The big producers are confronted by new norms of production and consumption, by the dilemma of how to deal with the costs already sunk and a regression in their own pretensions of domestic integration. The smaller producers, especially those who have tried to formulate common programmes through sub-regional schemes, have found their dreams continually frustrated by the activities of the TNC. While the latter do not want important new production sites to grow up, except if chosen by them, they also do not wish to lose strategic positions within markets.

The standard result has been that several firms remain in a fragmented set-up where everyone is producing in a costly fashion but no one is prepared to leave. India and China both have interests in production, yet neither of them is making a significant effort to develop in ways outside of the TNC framework. Quite the contrary, they have both begun to take serious options as to which corporations they will deal with. In a world where the renewed investments concentrated in the principal OECD locations may well generate appreciable overcapacity in the next few years, and where, in our view, the short- and medium-term prospects for sizeable increases in sales within developing countries are not bright, any new major agreements will have to have some export bias. It follows that not only the traditional developing country producers but also the prospective large new ones are both locked into the transnational network of production and intra-trade. In our view it is indeed doubtful whether the LC requirements set in much of the Third World can be enforced. Calendars were not maintained in the past, target levels were reduced, definitions of LC were liberalized - we see no reason why those features will not continue to define developments in the next few years. To look at these matters in more detail, the next chapter examines the position in selected developing countries.

CHAPTER VIII

THE EXPERIENCE OF SELECTED DC

A. Brazil

Brazil is by far the largest producer of fully built up vehicles in the whole of the Third World. At the beginning of this decade production volume was close to 1 million units, which placed Brazil among the leading 10 producers. Substantial export activity is carried out from the country, both through sales of finished vehicles and exports of components. Inside the Brazilian market the leading producer is VW and that company is in fact the largest manufacturer in the whole of Latin America, irrespective of the industrial sector considered: in 1978 VW do Brasil alone had an output in excess of that of either Mexico or Argentina and it is now running at a level roughly the same as the production by VW in its home base, FRG. As an export location Brazil is second only to Mexico; at the beginning of this decade 24% of all Third World exports to the OECD in this sector came from Brazil.

As elsewhere in Latin America, the real growth of the industry began in the second half of the 1950's where strong efforts were made to attract foreign producers; as noted in the preceding chapter, the degree of subsidy provided to foreign investors in those early years amounted to some 89 cents for every dollar invested. The structure of the industry at that time bore the familiar characteristics. Following the 1956 regulations, 11 firms initiated production in the country but at a scale below 10,000 vehicles when the international level was around 80,000. At that time LC was of the order of 40% and an objective of some 90% was established. "The number of auto parts manufacturers grew in 3 years after 1957 from 700 to 1,200."[1/] Within a relatively short time Brazil had begun to look for exports and its first significant programme to promote them was established in 1961. At that time the programme was applicable to all industries but in fact 50% of the approved schemes were in the automotive sector.

Subsequently the accent on export promotion has been emphasized and the industry has benefited from considerable incentives; in 1975 it was estimated that the value of these incentives equalled approximately two-thirds of the value of exports themselves and in recent years the likelihood is that those proportions have not fallen. Yet, notwithstanding the tremendous emphasis on export promotion, the automotive sector has exhibited the twin characteristics of large scale foreign sales but a continuing drain on the balance of payments. In 1974 the automotive sector accounted for some 12.2% of the balance of payments deficit, and even in 1980 vehicle producers were still responsible for 12% of the total foreign deficit of the economy.

Over time, therefore, the destination of production has switched markedly from a total concern with the domestic market to a strongly export oriented structure. That structure has been reinforced by large scale subsidies from the government - an idea of the value of the export subsidies can be obtained from the experience of Volvo in Brazil. "In 1977 Volvo do Brasil entered into an export agreement, promising to export 30% of total production at a value of not less than $351.8 million the terms of the agreement are from 1979 to 1988. In exchange for this export commitment, Volvo do Brasil obtained exemptions on import duties for machinery, equipment and components during the initial phase at a value of $22.2 million. Furthermore, 26% of sales value of exports are granted to Volvo do Brasil in a form of a tax refund"2/. The company also benefited from export credits.

With regard to the progression of LC, this had by the mid-1970's reached levels approaching the 90% target set in the previous decade. The Brazilian government was ready to trade off some percentage of LC in return for additional exports; by and large the reductions went down to around 75% depending on the size of the export commitment and the corporate trade balance. In this respect each company was then able to make its choices regarding imports of components as against exports of products. It has been estimated that over the past few years the total exports under the so-called Befiex programme to stimulate industrial exports have totaled some $55 billion of which the automotive sector has taken an appreciable share. Under current commitments for the period 1983-1989 Ford claims it will make $3 billion of foreign sales of cars and parts, VW $2.9 billion through vehicle sales, Fiat $1.9 billion and GM $1.1 billion.

The complexities of the Befiex programme, nevertheless, are such that the corporations would still have an interest in continuing with exports, naturally subsidized, but with more freedom on the import and LC side. A recent commentary on the trade difficulties between US and Brazil has noted: "the US multinationals have been the major beneficiaries of a programme which has covered exports worth over $55 billion in the past decade. Surprisingly, companies like Ford and GM which use Brazil as a manufacturing base to supply their main operations in the US and Europe, or those like General Electric which has just established a large electric iron plant, do not appear to have been lobbying in Washington to tone down official US wrath against the Befiex programme"3/.

In the recent period Brazil has been integrated far more into the overall production network of the TNCs, particularly GM, Ford and VW. It has been estimated by Ford that the Brazilian wage rate, including fringe benefits, in vehicle production is about one sixth of average European rates and about one eighth of average US rates. If the savings in labour cost are combined with the substantial subsidies from the government for local production and export, then it is not difficult to see the attraction of location in Brazil. According to the President of Ford Brasil: "there is no other country in the world that is as good as Brazil in low cost manufacturing."4/ At the same time the Brazilian market at home remains of great strategic importance. Some idea of the underlying optimism of the TNCs can be obtained from the following two observations. "VW do Brasil is the only large passenger manufacturer that has not gone the route of the world car. Instead, VW has divided global production between Brazil, its largest foreign operation, and the headquarters in FRG."5/ The attitude of the TNC towards Brazil as a locus for future sales is well summarized by a further quote from the President of Ford Brazil: "one car for every 18 people and half the population under 18. Brazil has got to be a dramatic market."6/

The structural shifts in the automotive sector in Brazil have replicated those occurring elsewhere. Data presented in the preceding chapter have indicated the degree to which both the vehicle producing sector and the parts sector have been denationalized. More specifically, regarding parts and components it has been noted that "out of the 100 major suppliers, 52 had foreign equity participation whereas among the following 352 suppliers, only 55 had such relations with foreign firms"7/. In relation to Volvo we find that "the foreign influence in the parts industry is further underlined by the fact that half of the supplies purchased locally by Volvo do Brasil come from foreign owned firms or Brazilian companies with heavy technological dependence on foreign corporations."[8/] Moreover, the Volvo policy is a striking example of the reproduction of vehicle/supplier firm relations in the core countries: "the design of the production process at Volvo do Brasil... identified all of Volvo's suppliers in Europe who also possessed subsidiaries in Brazil"[9/]. VW is also known to have actively encouraged its usual European component suppliers to establish themselves in the Brazilian market.

The Brazilian government has devoted substantial attention to supporting the automobile industry through what is tantamount to one of the largest R and D operations carried out in any developing country - i.e., the so-called gasohol (Proalcóol) programme. Put in simple terms this programme recognized the severe impacts on automobile purchases which could arise from the sharp increase in petroleum prices in the early 1970's. The thrust was to try to produce a much cheaper fuel which would be a mixture of petroleum and alcohol obtained through the distillation of cane sugar. Initially the aim was to provide a mix which would not necessitate any alterations to vehicle engines, but subsequently the scheme went further and suggested engine conversion for fuels which would gradually be 100% alcohol-based.

To carry this out negotiations were undertaken with VW to see if it would convert a major part of engine production to those capable of running on 100% alcohol. This was in fact done and by 1980 the programme appeared to be a spectacular success since no fewer than 21% of all vehicles produced were aimed at using 100% alcohol. Yet shortly thereafter, there was an equally spectacular drop in sales. In 1981 the figure had dropped to only about 40% of the sales initially projected under the government programme and they had continued to fall ever since. The problems appear to have come not from technical deficiencies in the conversation process either of the fuel or of engine production, but from a combination of the enormous pressures the programme puts on the agricultural sector and the actual handling of product pricing.

To produce sufficient alcohol would require the conversion of an exceptionally large percentage of Brazil's cane sugar output and thus a diversion of those resources from potential exports. On the pricing side, the savings have been cut back sharply due to a reduction in the price differential between alcohol and gasoline which almost eliminated the real savings (alcohol cars burn about 20% more fuel than petroleum-based vehicles). Overall, the position now is that confidence in the programme may have been severely shaken so that even if the price differential could be restored to its previous level, it is unlikely that consumers would switch so readily to alcohol-based vehicles. Although in 1981 sales of them were reduced to only about 15% of total sales, and that in a market which had fallen by some 40% compared to the previous year, it is possible that in the longer term the alcohol powered vehicles could regain a market share within Brazil of say 25-30%.[10]

This substantial R and D effort, reported to have cost in the region of $6 billion, is certainly unique in the Third World with regard to the automobile sector. Unfortunately, this effort does not change and has not changed the fundamental parameters within which Brazil operates. From an initial situation of import substituting industrialization, followed by a long period of diverse attempts at export promotion without losing too much of the LC thrust, the country is now being firmly incorporated into the strategic networks of the leading producers and above all GM, Ford and VW. It is difficult to imagine what fresh initiatives the government might take and, as far as is known, none are in fact in preparation.

The corporations have acquired total control over vehicle production itself and a very strong grip in the parts sector. The levels of LC are on the surface high, but in fact the dominant component companies are under the control of foreign capital and their connections with vehicle producers are governed essentially by the reproduction of relationships found elsewhere. Although Brazil is clearly the most important developing country as a producer of vehicles, and has an internal market potential which exceeds that of almost all others, the country at present seems to be in a particularly weak bargaining position. It is unlikely that any fresh policy steps will be taken in the near future.

B. Mexico

In the early years of the industry in Latin America, Mexico was in a weaker position than either Argentina or Brazil. The former country had an industrial sector in the 1950's which was relatively very highly developed and in a position to achieve LC levels much above those which could be envisaged by other developing countries. Brazil, as just noted, was seen as a country with enormous potential and therefore an ideal strategic site. Nevertheless, subsequent developments have placed Mexico in the forefront of territories where TNC have located themselves. The policy pattern of the industry in Mexico has not differed significantly from the sequence to be observed elsewhere, but the decisive change of recent years has been the very heavy concentration of enterprises producing within the US on Mexico as the ideal off-shore base.

Prior to the early 1960's there were about a dozen firms assembling in Mexico on the basis of imports of completely knocked down (CKD) kits; but with the August 1962 decree aimed at a 60% LC in the industry, conditions began to change. That decree was enforced from 1964; but even at that time it was found that the balance of payments impacts of the industry were still severely negative. That problem has been the scourge of Mexican planners ever since. In essence, the choice was to increase LC, to develop exports to compensate for imports, or to attempt some combination of the two. The policy measures have subsequently been initiated at the rate of 1 major decree per President. In both 1969 under Díaz Ordaz and then in 1972 under Echeverría, the emphasis was on export promotion while under López Portillo in 1977 the attempt involved compensating imports with exports while trying to achieve some increase in LC. A regular tool to try and enforce these schemes has been the use of domestic market quotas, i.e., conditioning shares of the domestic market on a firm's performance in meeting the specifications of the policy.

Whereas in the Brazilian case the development of the domestic market has played a pivotal role, in Mexico the trade involvement and thus external orientation of the industry has always received relatively more emphasis. Furthermore, the bias in Mexican policy has been in the direction of the component sector as a basis for trade rather than the production of complete vehicles. In 1975, for example, only 6.6% of exports from Mexico were finished vehicles. The parts exports in fact originated to a large extent from component supplier firms. But since in most cases there was only one potential buyer for any of these parts, what in fact happened was that the vehicle producers purchased them within Mexico, exported them in their own name and then used those export credits as the basis for imports. The changes in the structure of the sector over time have, in this case also, followed the standard pattern with TNC dominance of the vehicle producing sector and with a very strong grip in the components area.

At present, the Mexican industry is very firmly integrated into the international network. More particularly, it is the favoured base for TNC who have major production bases in the US. Thus, "no plans currently exist for any independent producer to begin manufacture for the foreseeable future, Mexico will remain an assembly base and low cost manufacturing platform for the US recent expansion plans have brought engine plants to Mexico from every major US car producer altogether the plants operating in 1981 are estimated to have exported $50 million worth of engines in that year. But by 1984 that figure is expected to reach $500 million - again mostly going to the US. The one factor which all these plants have in common is that they are all producing engines designed primarily for incorporation in US built cars... this fact helps to explain why the majority of plants are located in the north of Mexico, typically 100-200 miles south of the US/Mexican border."[11/]

These location shifts have undoubtedly received in recent months an additional and very substantial bonus from the devaluations of the Mexican peso and the increase in the external value of the US$. The Mexican government continues to subsidize heavily these exports in much the same way as those in other industries in the border area. Consequently, the policy pattern has altered little from the past. Back in 1969 it was calculated with regard to export incentives that the auto industry "represented 40% of the total fiscal receipts foregone by the State for promotional purposes"[12/]; in 1981 it was reckoned that the auto sector was responsible for 36% of the total balance of trade deficit of the country.

It would be, furthermore, a mistake to imagine that the export earnings attributed to the automotive sector are all due to output from that sector. The operation of government schemes relates to enterprises and consequently as long as they are able to show that they have obtained foreign exchange, that is sufficient to qualify them for the right to import. "Coffee and bauxite trading may seem remote from motor manufacture, but they have this in common for VW's ailing Mexican operations, they help provide the foreign currency it needs under Mexican foreign exchange controls to import components ... in recent months, VW has opened up a new coffee market for Mexico worth $40 million in the 6 months to April (1983). VW is acting as the intermediary between the Mexican Coffee Institute and European dealers who are selling the coffee to non-members of the International Coffee Organization. Similarly, VW is negotiating a deal to sell 10-12,000 Beetles - the most popular car in Mexico - in Jamaica. But, with Jamaica facing its own foreign exchange problems, the deal depends on finding a buyer for the Jamaican bauxite who pays in dollars "The Mexican VW plant is also seeking to expand its present arrangement with VW do Brasil, under which the two companies barter components. This is reflected in the largest container harbour in Mexico being at the VW plant.[13]" Hence we have a splendid example of a TNC going into commodity trading, and, to boot, in a way which goes against prevailing international arrangements in the field, in order to qualify as a larger scale importer of components. If other similar instances were to be demonstrated, they would cast considerable doubt on the real efficacy of some of these compensation schemes.

The Mexican administration has recently (September 1983) introduced new regulations to limit further the number of makes and models in the domestic market and to strengthen export incentives. Thus far implementation of the new decree is in its infancy and only time will tell whether the new rules can significantly improve the situation. The position, however, is a difficult one since the incorporation of the country into the international network is already so far advanced and because the foreign exchange situation is so precarious. Faced with those twin difficulties there appear to be few options available. Perhaps the main asset which the country has at the present time consists in the large investments which have already been made by foreign enterprises. They may imply that the administration could at least reduce by a degree the incentive package offered to these firms so that the total costs could be contained. But overall Mexico certainly does not enjoy any more freedom of manoeuvre than does Brazil.

C. India

For more than two decades the Indian auto industry has been in a more or less static situation. In that period it is certainly true that component firms, generally established through initial technical and/or financial collaboration with European companies (particularly from UK and FRG), have improved their capabilities. Yet that improvement has been within an overall technological framework whose parameters did not significantly alter. The reason is that, in the light of the country's fundamental problems of poverty and maldistribution of income, the production of passenger cars quite rightly did not have a high priority. Under the current adminstration, however, a decision has been taken to open up internal production to new external currents and that is the rationale behind the 1982 Maruti-Suzuki arrangement.

This is "the first time that a project in the public sector is being launched with foreign equity participation. Suzuki will have a 40% equity in the project and hence also a full share in the management of the project, both at the construction and operational stage."[14/] The 40% referred to in fact represents the option which Suzuki has; but nevertheless from the beginnning of the project it has a vital 26% stake. Leaving aside for the moment the question of who will purchase the vehicles - and that involves basic policy decisions in India aimed at promoting effective demand from those income groups who actually can afford private cars - a central element in the project relates to the degree of LC.

In the initial stages, it will only be some 20-30%; but various official remarks have been made to the effect that later on it could be 50% or even up to 90%. The core of the arrangements nevertheless can be described as follows. Maruti wants engine assembly by 1985 and full manufacture in 1986; but this is clearly very optimistic. If it is to be possible "Maruti will soon have to decide where to buy components in India. Since Suzuki has a 26% equity stake in the project, it possesses a significant if not decisive say about where orders are placed to obtain an acceptable quality. The Indian components industry is dominated by companies originating from the UK, with some from FRG and elsewhere with companies such as Lucas, Dunlop, GKN and Bosch in part ownership. These companies do not want to be driven out of a major part of the industry's expansion by Suzuki insisting on the creation of new separate suppliers.

The ace in Suzuki's hand worries all the Indian industry. If it and the other Japanese companies are able to argue that the quality of Indian components is not high enough, there could be a virtually cast-iron case for the Japanese to refuse gradually to switch manufacturing to India some of the Japanese companies - including Suzuki and it is believed Honda - are following the Suzuki/Maruti car example and demonstrating their potential commitments to the ventures by taking 26% stakes (under Indian company law, 26% gives power of veto over certain key decisions)"[15/].

Thus the opening of the Indian market is immediately raising familiar questions regarding the extent and pace of attainment of LC, the difference between nominal and real LC stemming from foreign ownership of component producers and the use of imported inputs by them, the problems of expanding car consumption in a country with the enormous difficulties facing India, and at the same time indicates one or two newer twists with the creation of an explicit JV between a public enterprise and a TNC as well as the question of how a Japanese production system can be moved into an environment very foreign to it. Subsequent to the Maruti/Suzuki deal there have not been any other arrangements in the private car cum commercial vehicle sector, although several other accords have been concluded in relation to other kinds of motorised transport. For the moment, therefore, Suzuki has secured a monopoly, since it is almost sure that the firms producing the Ambassador and other models based on old designs will have great difficulty retaining their market shares.

D. ASEAN

ASEAN has adopted a loose approach to economic co-operation but within that has devoted considerable attention to the vehicle sector. Within the sector, various attempts at building up complementation schemes have been made but have persistently foundered on the twin rocks of the decisive presence of Japanese firms in all of the countries (except Singapore), and the different conceptions which various Member States appear to have regarding the possibilities in this sector. All members - except Singapore, which totally gave up vehicle production at the beginning of the decade - are examining the state of the sector. "South East Asian governments want to overhaul their rattletrap car industries. Local assembly of cars, usually in partnership with Japanese companies whose vehicles have 80% of the region's market, has proved expensive and often pointless. Governments encouraged too many countries to enter the industry. Local component makers were inefficient and their quality poor"[16/]. Whilst Singapore has completely given up any domestic production and has moved its policies very firmly towards component production[17/], Malaysia has taken a different line and launched a so-called national car project.

That project is formalized in an agreement signed in May 1983 between Hicom, which is a public enterprise created in 1980 (when Malaysia's current President was Minister of Industry) to spearhead a drive by the country in heavy industry, and two of the Mitsubishi group companies. The JV so formed, Proton, has 70% Malaysian stockholding through Hicom and 15% each for the two Mitsubishi companies. Initial LC under the project is estimated at about 36% and is forecast to rise only slowly thereafter, one of the points perpetually under discussion being whether parts produced elsewhere in ASEAN would qualify for national treatment or not. Production is scheduled to begin in mid-1985 with a body stamping plant producing 80,000 units a year (a level significantly below what is normally regarded as adequate plant size) and anticipated to reach 120,000 units by 1988. The expectation is that the car would eventually capture some 60-70% of the domestic market but exports are not given any priority. It should be noted that at present LC in the Malaysian auto sector is around 10-15%.

These brief details are enough to show that the phrase 'national car' is a misnomer. Foreign participation is very high and it seems difficult to imagine that the project could successfully be used as an industrial base. Malaysia is a country with a population of around 13 million and though it has been by far the highest per capita purchaser of motor vehicles in the ASEAN region, it certainly does not have the internal demand which would sustain a project genuinely permitting very high LC. But much more serious than the market question is, of course, the fact that internal production is currently dominated by front rank Japanese TNCs. It is thus no accident that it is a second rank Japanese firm which has concluded the deal. If the larger enterprises come to perceive it as a threat to their control, they will certainly react. While it may be possible for Malaysia to derive some benefits from those reactions, and indeed it may be this gamble which is really behind the scheme, it seems improbable that the longer term market structure could be decisively altered in favour of national production.

The Philippines is also trying to tackle the sector and has announced the outline of a programme for its reorganization. In July 1983 the Minister of Industry said that all imports of partly assembled kits would be banned unless prices in the Philippines were reduced to no more 85% of the ex-factory price of cars fully assembled in Japan. Furthermore, it was indicated that 3 of the

5 firms currently in the industry must either merge or go out of business. The 5 concerned are 3 Japanese affiliates and the local companies of GM and Ford. The Japanese firms have already got together and submitted proposals which would keep them in business consistent with the new conditions, but at the same time the Ministry has also invited bids from Hyundai and some European firms. The reaction of the US affiliates has so far not been made public though it is known that these firms claim to have regularly made losses during the decade they have been in operation; they assert that the losses exceed $150 million. The government refuses to accept these assertions and instead argues that, among other things, the affiliates have practised substantial transfer pricing which has been the real source of their profits. This is not the first attempt to reorganize the sector in the Philippines since a couple of years ago similar ideas were advanced.

The one clear result at present is that the plans of some years ago (the Progressive Car Manufacturing Programme, PCMP) under which LC was to be raised to 55% have for the moment been scrapped. The component sector is in serious trouble: "Many of the 220 firms trying to eke out a living making car parts are in a bad way"[18/]. Instead the accent seems to be on streamlining of the sector, though it is hard to imagine that any of the giants will allow themselves to be elbowed out.

The situation in Indonesia and Thailand repeats the familiar litany, accentuated as it now is by the sharp slow down in the high economic growth rates to which the region had become accustomed in the 1970s. As always the bite comes first against plans for LC. In Indonesia "recession may delay plans to make all car parts locally by 1987"[19/], while in Thailand the administration has recently abandoned its schemes for pushing LC beyond its present levels (nominally in the 45-50% range but in reality probably no more than 30-35%). In both cases new strategic decisions are needed; yet both countries remain semi-paralysed in the face of their overall economic crises and the power of the TNCs.

E. Republic of Korea

This is the only developing country which has consciously set out to establish a national car industry; i.e., an industry in which the involvement of TNCs through direct investment would be strictly limited and in which domestic capabilities would be enhanced rapidly so that LC would reach 100%. The industry in Korea has 6 manufacturers and roughly 600 parts firms. It is, however, dominated by two vehicle producers, Hyundai (of which a 10% stake is now held by Mitsubishi) and Daewoo Motors (formerly called Saehan, of which GM holds 50% but with management, since January 1983, in the hands of Daewoo Corporation). The latter firm has always had strong involvement from GM and consequently the push towards national production has come through Hyundai. In fact that company was totally in national hands until quite recently when a major expansion project was launched and Mitsubishi purchased its proportion of the shares.

The Hyundai company began its activities in the auto field in the 1960s with the import of designs and complete kits from abroad, developing its foreign collaboration mostly with UK and Japanese enterprises. The decision to aim for a national car was not taken until some time after the beginning of the firm, but has been pursued vigorously ever since such that it is now reckoned that the LC in the production of the main model, the Pony, is of the order of 96%. At present the Pony is sold in approximately 50 - mainly developing - countries, although in 1982 one quarter of the exports went to Europe. And plans are well advanced, with Mitsubishi's help, for the launch of Pony II which it is hoped would represent a decisive break into key foreign markets. Indeed output growth for 1983 is projected at 38% which, given the slow growth of domestic demand, implies a strong orientation towards export.

Despite the seriousness with which the project has been pursued, it is nevertheless not in an encouraging situation. The problems are two-fold; notwithstanding the size of the country, the Korean internal market is not particularly large (in 1981 the stock of private cars totalled approximately 200,000 in a population of around 40 million). This is due not only to the income level but also the very severe taxes and other restrictions imposed on automobile ownership; consequently the domestic sales base leaves considerable capacity underutilized. On the other hand the problems of achieving technical command in design as well as advanced production methods are also severe, yet need to be solved since otherwise the exports required to keep production at levels commensurate with reasonable costs will not be achieved.

In fact it appears that Hyundai was only operating at something above 50% capacity utilization at the time the decision was made to more than double capacity with the technical and financial assistance of Mitsubishi. The company is clearly banking on significant exports of the second version of the Pony and to do this obviously felt that the help of a TNC was vital. Such a firm could hardly have been selected from the top rank since otherwise the dangers of domination would have been too great; given that the Asian market is a primary target for Hyundai sales, and that not so many European firms appear to be interested in extending themselves too far in Asia, then the choice from Japan was a logical one. The prospects under the new project are difficult to judge. The fact that it has been launched is testimony to the government's determination to keep the auto sector as a pivotal point of its industrial strategy. But unless the large-scale production runs and a strong penetration of export markets can be achieved, then the over-capacity problem will return in still more serious fashion than in the recent past.

The government has clearly felt that the domestic industry should be converted into the monopoly of a single firm and even three years ago made determined efforts to promote a merger between Hyundai and, as it then was, Saehan. But after long negotiations this project foundered. The main block seems to have been the position of GM as a major shareholder in Saehan/Daewoo. For the US enterprise, the strategic interest must be to open up the Korean market and to create the opportunity to incorporate Korean production into the global strategy of GM, above all its efforts in the Pacific Basin. In short there is a fundamental conflict. The government is trying to put a new enterprise into the global oligopoly while GM is trying to breakdown what it must regard as a strategy of market protection. Given that labour costs in the Republic of Korean are low in relation to productivity, the country clearly could represent an interesting site for off-shore sourcing and/or integration into a global strategy.

For all this, the Korean example remains of great importance. It is the one case where foreign investment has been consciously kept to a minimum over a long period and in which an attempt has been made to follow the Japanese route. At the moment the prospects of success are not high; if this project fails, then there will be no case in the Third World of a producer trying to go it alone.

CHAPTER IX

STRATEGIC OPTIONS FOR DC IN THE AUTOMOTIVE INDUSTRY

A. An Overview of Possibilities

If we consider both vehicle and parts production, as any strategic approach must, then the main possibilities, not necessarily mutually exclusive, can be sketched as follows:

(i) Entirely national production of cars with foreign investment more or less excluded, but with technical collaboration.

(ii) Domestic production of vehicles with control of that production in the hands of TNCs.

(iii) To focus domestic production primarily on components produced by and for the TNCs i.e., to become a platform from which off-shore sourcing is conducted.

(iv) To become a seller of original equipment and components on an international scale, trying to do this through domestic firms which are not totally tied to specific vehicle or component TNCs.

(v) To seek export sales via the production of replacement parts which can be sold on the international market; once again this production would not be captive in the hands of TNCs.

(vi) To concentrate only on local production of commercial vehicles; within this, of course, the very strong probability is that deals would be made with TNCs.

(vii) To forego any attempt whatsoever at domestic production, save perhaps for minor replacement parts which could be made by competent local producers, and thus to import all vehicle requirements.

Table 23 spells out policies in 10 developing countries towards LC and CBU imports and Table 24 provides a categorization of existing automotive policies in 25 developing countries in relation to equity ownership, model variations and the extent of LC. Read in conjunction with the seven possibilities just listed, it is possible to map the present policy terrain and the available future options. Table 23 shows that LC levels vary enormously with only Brazil, Argentina, Republic of Korea and, to a lesser extent, Mexico in the set of countries who have advanced most of the way towards integrated local production. Of the other countries listed in that table and in Table 24, the prospects for expanding LC by a significant margin in the next few years must be regarded as slim. On the equity ownership side, shown in Table 24, the penetration of TNCs is deep, with only a handful of developing countries in which public ownership is important so far resisting the trend (and even there Algeria and China are already entering the JV stage). The impression from Table 24, as well as from the growing tendency to trade-off LC for exports shown in the third column of Table 23, is that most developing countries are evolving towards less rather than more integrated structures.

If the seven points listed above are checked against the actual behaviour of developing countries, then the picture is roughly as follows. No country save for the Republic of Korea is in the first group. The leading example of strategy (ii) is Brazil, though of course Mexico, Argentina and Yugoslavia are partially doing the same. For approach (iii) Mexico is the leading case at present. No developing country has yet attempted to pursue strategy (iv) for any length of time but it does seem that this is the option recently selected by Singapore. Likewise the fifth approach has yet to be taken as the main thrust by any developing country, although some Asian countries may now be considering a switch in that direction. Strategy (vi) in practice is what has happened in several of the larger African countries. Strategy (vii) has been necessarily the case for quite a few smaller African countries as well as some in Asia, but more particularly has been the conscious choice during the 1970s of one or two Latin American countries, most particularly Chile, which previously did have a reasonable level of LC.

At the outset it is crucial to underline the fact that, in most instances, it is quite incorrect to suppose that developing country governments are really making the selections. After all, at least half of the approaches

Table 23

Policies Towards Local Content and CBU Imports in Selected Selected Developing Countries

Country	LC(%)[a]	Mandatory(M) or Free Choice(FC) of Parts by Producer[b]	LC Reductions Permitted against Exports[c]	Duty on RD Parts (%)	Policy on CBU Imports
Republic of Korea	100	-	-	80	Duty 150%
Province of Taiwan	70	FC	Yes	25 - 35	Duty 65-75% No Japanese CBU
Thailand	45	FC	No Provision	10 - 80	Prohibited
Malaysia	At most 35	M	No Provision	No duty	Strongly Restricted
Indonesia	Minor; less than 20	M	No Provision	100	Strongly Restricted
Philippines	45	FC	Yes	30	Strongly Restricted
India[d]	50	FC	No Provision	No duty	Strongly Restricted
Mexico	58	FC	Yes	Duty(?)	Prohibited
Brazil	78 - 95[e]	FC	Yes	Duty(?)	Duty 200%
Argentina[f]	80	FC	No Provision	No duty	Duty(?)

Notes:

[a] LC data represent probable maximum in each country. In several cases it is likely that 'real' LC is a bit below the figures cited; there are substantial differences between firms regarding LC levels. Numbers refer to the present situation - despite existing programmes for increasing LC, these numbers might well represent 'ceilings'. at best in the short to medium term. LC for commercial vehicles would be higher in most DC.

[b] Mandatory means that the government policy specifies which parts must be produced locally. Such specifications are especially important in the early stages of local production, i.e., when LC percentages are fairly small. At more advanced phases the increases in LC have to be made chiefly through quantum leaps : here although 'free choice' has been entered against, for example, Brazil, technical factors in reality strongly condition the options.

[c] Policies which allow greater than usual import of components provided certain export targets are fulfilled. These allowances are normally negotiated on a company by company basis.

[d] The entries in this row relate to the conditions emanating from the 1982 Maruti/Suzuki agreements.

[e] Items purchased from other Latin American countries qualify for LC treatment provided they do not exceed S90 of the value of the vehicle.

[f] The Argentinian entries may overestimate LC due to the drastic shrinkage of the industrial sector under the military government.

Sources: Personal files.

Table 24

Schematic View of Automotive Policies According to Equity Ownership, Model Variations Permitted and Degree of Local Content, Selected DC

Ownership	Unrestricted Foreign Holdings		Restricted[a] Foreign Holdings		Public Sector[b] Ownership	
LC \ Models	No Limits[c]	Restricted	No Limits	Restricted	No Limits	Restricted
CBU import only (no LC)	Saudi Arabia		Kenya			Iraq Pakistan
CKD import only (local assembly only)	Ivory Coast		Nigeria			Algeria Iran
Limited LC, no export	Chile Thailand Malaysia Peru Colombia		Indonesia	Egypt India		China
Medium to substantial LC, parts export	Venezuela		Philippines (Singapore)[d]	Taiwan		
Full local production with export of CBU KD kits and/or parts	Brazil Argentina[g]		Mexico[e]	Republic of Korea[f]		

Notes: Some assignments of countries may change in the near future; other countries e.g., Chile, Peru, have altered policies sharply in recent years and now occupy positions significantly different from what would have been the case in the recent past.

[a] Limitations placed on number of foreign investors, size of equity participation and/or screening and monitoring procedures in force.

[b] Government control of production and/or distribution enterprises. In some cases both public sector firms and foreign ventures operate.

[c] Where CBU bans are in force e.g., Thailand, there is clearly an implicit limit on the number of models. The 'no limits' then refers to the absence of model restrictions on these producers within the country.

[d] Singapore does not produce cars: its activities in the components sector, however, are aimed at exports.

[e] Mexican LC is perhaps lower than that of the other 3 DC in the last row of the table, but it is substantial and there is extensive parts export as well as of CBU vehicles. Mexico also imposes domestic market quota as a device for controlling operations of foreign firms, particularly those whose trade performance is inadequate

[f] The Republic of Korea is, through Hyundai's Pony model, exporting its own car. The real degree of its design independence is, however, quite limited. CBU exports from the other DC are from TNC affiliates.

[g] Exports are negligible, both for CBU and parts.

Sources: Personal Files.

imply working with the TNCs, securing their interest, and making sure they stay interested. In these circumstances the choices are at least as much those of the corporations and the local groups with whom they are linked as of national governments. Furthermore, to pursue approaches which aim at 'non-captive' sales on international markets implies not only that vital marketing and distribution capacity, let alone production skills, will be built up, but also that governments in the prospective markets pursue policies permitting such trade. Since government policy is itself a function of the pressures exerted by the TNCs, these routes also cannot be considered independently of corporate power.

Furthermore, strategic choices cannot be made on a tabula rasa. In each developing country powerful internal and external interests related to the auto industry exist and cannot be ignored; on the contrary, it will almost certainly be these groups who have the biggest say in any shift of policy. Consequently, even the use of the word 'strategy' may pretend too much - in practice we are talking of processes, possibly lengthy, to nudge structures in one direction rather than another.

B. The Key Issues

The auto industry is an industry where power relations are of the essence. It is scarcely conceivable that any strategy, or set of policies, could be initiated and implemented unless government involvement was at the centre of things. In all those instances where TNC are directly involved (e.g., focusing especially on domestic production with control in the hands of TNCs and on domestic production of components for TNCs), the only way in which a developing country could obtain any kind of acceptable arrangement would be through direct government negotiation with the TNCs backed up by fiscal and other policies. In practice what has happened in most of those cases is that the government has effectively mortgaged its policy power to the foreign corporations. The experience of individual developing countries mentioned at various points in this report shows that whenever policies have been altered, the involvement of the TNCs has always been intensive, and in the more numerous instances where policy changes have been blocked or it has been impossible to implement policies, then the TNC have likewise been in the thick of things. Moreover, it follows from the arguments in the text that efforts to create a more independent approach - of which the strongest example is entire national production, although both production and sale of original equipment and components on an international scale as well as of replacemnet parts' sales internationally (in both cases not tied to specific TNCs) would qualify - can also not succeed unless there is state involvement all the way. In the first case - national production - the state must almost certainly be the owner as well as the supporter of the enterprise - this was the case in Nazi Germany, it is the case today in the Republic of Korea and would have to be so in any other attempts. Yet both of the latter two (parts-oriented) approaches could scarcely hope to succeed without intensive action by the government. It is no accident that Singapore is the place most considering the international production and sale of original parts. The economy in that country is extremely closely directed by the government and both technology and export behaviour of firms come under the constant scrutiny of the ministries.

Even in the case of international sale of selected replacement parts, the marketing effort necessary, not to mention the initial choice of parts and technologies for producing them, could scarcely be undertaken by individual firms. In fact, the behaviour of Japanese and Korean enterprises in export markets over the past decade and a half has been powerful testimony to the necessity for a strongly centralized set-up which, in the case of those two countries, has involved intimate and permanent links, at many levels, between the governments and huge international trading houses.

Granted, then, that we are discussing choices where the government is directly involved, and in many of which the TNCs are at the very centre of things, the basic issue is to determine what is being sought through the policies. In the past the dominant aims, although not always articulated and certainly not realized, seem to have been the growth of a more integrated internal production structure with steady increases in LC; an increase in auto exports or, in the best of cases, a positive contribution to the balance of payments from the auto industry (including here financial flows as well as commodity flows); an increase in industrial employment; and a contribution by the industry to enhanced technological capabilities in the local economy.

But this listing of economic matters is insufficient. More than most industries, the auto industry has been one where the social and political impacts have always been at the heart of things. Although this has been obvious enough in the core producing countries, the same proposition holds in developing countries as well. In short, the particular structure in which auto functions contributes to the reproduction or transformation of underlying social relations. It would be a mistake to ignore this dimension; indeed, as hinted earlier, that is frequently the vital element as far as the local groups are concerned. This implies that policy choices cannot be made on the basis of calculations regarding economic costs and benefits alone. There are also the power relations within the local economy which must be examined.

This last point itself suggests one important question regarding strategic approaches by developing countries in the auto field viz. what assets do developing countries have which could be used in a bargaining process? In essence those assets are two: first, the political asset implicit in the right to grant or withhold access to the domestic market; and second, the economic asset of labour costs which are significantly below those prevailing in the OECD countries. The prevailing impression from a review of what has happened is that the former asset has only been employed to any effect in a few countries, while at the present time most DC are instead actually financing TNC to utilize their markets and are simultaneously proclaiming their own desire to keep labour costs down and offer TNC still more favourable conditions in which to produce.

The argument of this study is that a proper use of these assets can only be achieved if governments seek a long-term plan of development for the auto industry. If the decision is made to support vehicle production, but with the aim of strengthening local involvement, then an attempt must be made to come to grips with the technological basis of the industry. Given the new technological conditions in which the industry is operating, such an approach would require major investments in learning. It is our contention that only the largest and industrially most advanced developing countries could contemplate such an approach. However, if the accent is on parts production, then with careful selection of components, whether original or replacement, the investments would not have to be so great and it should be possible to consolidate a local structure in a relatively short time.

This kind of approach may be feasible for a larger group of developing countries which have a reasonably developed industrial structure and internal markets which guarantee a fair volume of parts sales. Where these conditions do not hold, then it seems to us that only the approaches of concentrating on local production of commercial vehicles and of foregoing any attempt whatsoever at domestic production can really be considered. Since commercial vehicles ought to have a much higher priority than passenger cars in the purchase behaviour of most poorer developing countries, approach (vi) has something to be said for it. However, this does require careful negotiations and that has been conspicuously absent from past practice.

In all of this there is always the possibility of some co-operation among developing countries to create shared production programmes and/or larger markets. Both the Andean Group and ASEAN have been active in this field; yet in both cases the results have been meagre. In our view the presence of the TNCs in each of these country blocks has been decisive in preventing the implementation of any policy. Although co-operation will continue to appear attractive, we believe that the real prospects, at least in the next few years, are slim.

CHAPTER X

SUMMARY AND CONCLUSIONS

The international auto industry is in the process of an unprecedented reorganization. That reorganization has accentuated the oligopolistic struggle for market shares among the world's leading TNCs. The proximate cause of the reorganization is the sharp slowdown in economic growth in the OECD and the emergence during the 1970s of Japanese enterprises as the world's leading exporters of motor vehicles. The basic reason for change, however, is the attempt of the industry to solve long-standing structural problems, of which the dominant one is the relationship with labour.

The crisis is thus a major opportunity for the TNCs to reorganize their production systems. To do this, they have acted along three lines: the incorporation of new technology; the consequent reorganization of plants, enterprises and relations with suppliers; and selective intensification of the internationalization process, particularly through inter-corporate collaboration, off-shore sourcing and global integration.

The industry is in the midst of a technological revolution which is again giving it the pioneer role which it had in the 1920s. Now as then it is leading the way in the establishment of production norms which will be followed in other manufacturing industries. The essence of the transformation is to allow the industry to shed a substantial proportion of its labour force and to combine large-scale production methods with custom-made products.

Vehicle producers are totally rearranging their links with suppliers in a move towards a Japanese style type of relationship. This shift is providing the momentum for a restructuring of components industries on the international scale. They are becoming more concentrated, more tightly linked with particular vehicle producers, and the producer/supplier network is now being reproduced in several economies.

The technological changes will probably allow the strongest of the large-scale producers and the technically most advanced of the specialist producers to co-exist in a future structure which will have still fewer corporations than in the recent past. It is possible that an ever greater proportion of the activity of specialist firms will be devoted to sophisticated design engineering and the sale of their services to other producers. In this sense the industry may come to resemble the chemical industries with their division of producers and engineering firms.

In the past the auto sector has been electro-mechanical based. With the current technological upheaval the industry may move to an electronics-plastics base. If that happens some of the innovations which have had such an impact in the past three of four years may themselves be eliminated.

Internationalization continues to be strongly dominated by GM and Ford, with VW and Renault operating on a much more restricted basis both strategically and geographically, and Peugeot and Fiat in relatively weaker positions. The Japanese TNCs are still in the initial stages of foreign investment.

Foreign production is characterized by the selection and reinforcement of strategic sites. Even for Ford and GM, these sites remain concentrated in a small number of countries in Europe and Latin America. At the present time these two companies are placing the emphasis on offshore sourcing with their plans for more complex global integration apparently in abeyance. The international networks established by them, however, would permit full global integration strategies to be implemented when required.

Collaboration is relatively little used by Ford and GM. The principal contacts which they have established are in arrangements with Japanese companies aimed at controlling access of Japanese products to the US home market and providing them with a springboard for operations in Asia.

Among the European TNCs, project collaboration to produce new designs, shared parts, and joint financing is much more frequent. In the case of the weakest firms it is a strategy for attempted survival.

The Japanese producers have so far been remarkably successful through direct export rather than other forms of internationalization. Now they are obliged to make basic decisions regarding whether, and in what ways, production systems will be established abroad. So far the signs are that those decisions are being made reluctantly and cautiously.

In this period of greater internationalization and concentration of the oligopoly, governments in both OECD and developing countries are becoming still further embroiled in the industry and yet have positions which are growing weaker in relation to the TNCs.

In the core producer countries governments have been acting as owners of car firms, stimulators of industrial reorganization and legislators, particularly of regulations to control fuel consumption. But now these governments also are being pulled into a similar policy setting as that which has faced developing country governments for some time. That setting is characterized by financial incentives to TNC producers aimed mostly at export, the build-up of LC, and the attempt to streamline market structures.

The financial incentive package has become perhaps the main feature of recent policy moves. In this respect there is now international competition among governments to attract TNCs. It follows that to talk of investments as emanating from the enterprises is only part of the truth; an increasing proportion of all auto investments is paid for by the governments in countries where these firms locate.

The massive investment programmes now launched by all leading TNCs are aimed primarily at technological renovation in their traditional production bases. These investments are accompanied by disinvestment in the form of significant plant closures. The net result, however, is the likely appearance of appreciable over-capacity in the industry during the next few years.

The history and prospects of the auto industry in developing countries do not make encouraging reading. Despite the relative stability of auto technology, both process - and product - wise, for many years, no full transfer of effective capabilities has taken place. Through the 1970s, industrial structures in the leading DC have been marked by the twin phenomena of growing concentration and denationalization in both the vehicle and components producing sectors. The balance of payments situation has demonstrated brief periods of positive results but an underlying trend towards heavy deficits has dominated.

This study does not share the optimism frequently expressed regarding prospects for domestic sales in developing countries. It is argued that the fundamental limits to consumption of private passenger cars in economies where the bulk of the population has such restricted purchasing power necessarily confine the market to small parts of the total. Even within those, the chronic foreign exchange difficulties and low or negative growth rates of almost all developing countries will act as a sharp brake on increased sales.

Production of vehicles will therefore have to be significantly oriented towards export if sizeable underutilization of capacity is to be avoided. That orientation places developing country producers in the hands of the TNCs.

For some developing countries there may be possibilities to develop production and exports through a focus on the parts market, both original and replacement. These approaches, as all others, would require significant government involvement.

The auto industry as a driving force for industrial growth in developing countries has thus turned out to be a frustrated dream. Unless an attempt is made to come to grips with the consequences of enhanced oligopoly power and rapid technological change, that frustration could turn in the next few years to a nightmare.

FOOTNOTES

INTRODUCTION

1/ If a much more wide ranging definition, to encompass even those using motor vehicles, e.g. truck drivers, as well as those in the sales and servicing branches, is chosen, then the estimates increase by a large multiple: "in 1977 in the US approximately 871,400 workers were directly involved in the production and assembly of motor vehicles and parts while, all in all, about 14 million US citizens were dependent on the motor vehicle for their income. According to another source, the auto industry on a worldwide scale employs 28-35 million people directly in the manufacture and assembly of vehicles and in vehicle component manufacture, and another 60-100 million people indirectly. Two-thirds of these are employed in the highly industrialized countries, and Western Europe alone accounts for some 42 million workers". See (26), pp. 5-6. The figures in the text are drawn from (37), 19 October 1982.

2/ See (58), p. 2.

3/ See (69).

4/ See (21) p. 25.

5/ See (12) and (79).

6/ It is estimated, for example, that GM only has 8% of its sales outside the auto industry. The extent of diversification is much greater for the Japanese firms given their interest in industrial and conglomerate groups: "Nissan and Toyota are really industrial groups of several hundred companies apiece. Many of these industrial groups are members of the larger 'conglomerate' groups. For example, Toyota and Toshiba once were part of the Mitsui Zaibatsu, and after some years of distancing, have begun attending the group's 'Club' organization once again. Industrial groups are also linked to each other in parallel arrangements, generally involving shared suppliers or shared owneship of principal companies... some of these lateral group relations allow much more product diversification than in US auto companies. For example, Toyota and Nissan groups are diversified into: housing, autoparts, consumer appliahces, weaving equipment, industrial equipment, machine tools, marine engines and boats, aerospace, shipping and shipbuilding... Companies in the US and Europe also have some diversification into aerospace, real estate and finance. But the number of product areas does not match the Japanese group context, and US producers remain highly concentrated on vehicle production". See (3), p. 7 and p. 17.

7/ "The most advanced aspects of motor vehicle manufacture are in the forefront of the automation of manufacturing processes: some plants are already 97% automated". See (21), p.16.

8/ Attempts to capture international markets had been made earlier, especially by Nissan at the beginning of the 1960s, but they had been unsuccessful.

9/ An example from the Arab world may suffice: "Iraq is pressing ahead with ambitious plans for founding its own automobile industry... Iraq was planning the motor industry as the nucleus for the further industrialization of the country. It would involve much local manufacture, not only assembly". See (37), 8 May 1981.

10/ Recent comments on the dilemma in Australia give a vivid illustration: "With the big 5 vying for a total market of only 600,000 vehicles a year, joint arrangements for the manufacture of components, and even engines, seem a near certainty. Some form of rationalization must be on the cards if the car industry is to emerge from its slump... The options include more quotas or tenders for the right to import, freezing or reducing the present import quota of 81,000 vehicles, reintroducing more local assembly, and raising LC from 85% to 90% or even 95%. But one of the biggest questions is over the future of the Fraser government's export credit scheme, which was suited to benefit GM Holden but has so far not generated any gains for them. Under the scheme car producers can dilute the LC of their cars if they export cars or parts of a certain value. They can reduce LC by a maximum of 6.25% if they earn the full export credit. This becomes 7.5% from next January, and the plan envisages a maximum 15% reduction in LC by 1987". See (37), 14 April 1983.

11/ See (40) for a detailed examination.

12/ See (1) for a critical treatment of the Fiat experience in southern Italy. The author argues that "Fiat's investments in the south have stimulated negligible productive growth" and that even the direct employment effects were very low: "It would that only a small proportion of workers were taken from the existing surplus labour market, whilst the remainder either transferred from other jobs or were subsistence farmers who did not give up their land." p.2.

CHAPTER I

1/ Ford opened major plants in the UK in 1931, Germany in 1932 and in 1934 had 60% of a joint venture with Mathis. GM moved via takeovers, capturing Vauxhall in 1925 and 100% of Opel by 1931; it had already in 1919 tried to take over Citroën in France but this move was blocked by the French government. Italy then, as now, did not have much foreign investment.

2/ Vehicle component producers, however, have often used technical collaboration arrangements along with minority equity holdings as a route by which they could establish themselves in other countries. The usual outcome has been full takeover of the local enterprise. The sale of completely knocked down (CKD) and semi-knocked down (SKD) kits is accompanied by contracts which not only charge for the items but also include royalties for the know-how associated with utilization of the kits. For analyzes of the pricing arrangements and other costs see (42) and (43).

3/ "Although protection policies varied from one country to another, the basic mechanisms were tariffs or import quotas to protect national industries from cheaper US imports... To protect against direct foreign investment, tax systems that discriminated against US cars were instituted in several countries, while Italy, where Fiat was growing increasingly powerful as the only major company, forbade any direct foreign investment". See (11), p. 7.

4/ At around the same period Japan initiated a similar approach with similar effects. "The strength of Japanese motor manufacturers like Toyota and Nissan today stems from industrial policies laid down before the second World War. The Automobile Manufacturing Law of 1936 required car firms in Japan to have a license to operate. At the time, motor manufacturing in the country was dominated by Ford (which had set up there in 1925) and General Motors (which followed in 1927). Under the 1936 Law, only two motor manufacturers were granted licenses - Toyota and Nissan. The Japanese government then supplied half their capital and granted them tax and import duty exemptions for five years. The Law effectively put the two big Detroit car companies out of business in Japan, as it was intended to do." See The Economist, 29 October 1983, p. 88.

5/ See (58), p. 41.

6/ American Motors, for example, has only retained a role through its production of Jeeps, which stemmed from war-time contracts.

7/ National designs have persisted in the main European producing countries.

8/ During the 1950s Japanese firms had been developing through a series of licensing arrangements with European manufacturers e.g. Nissan with Austin, Mitsubishi with Willys, Hino with Renault, and Isuzu with Rootes.

9/ "The British subsidiary of America's second largest motor manufacturer earned more in 1979 than the whole of Toyota... But while Ford has increased its share of the British car market substantially (now over 30%), it has been importing fully built up vehicles from its factories in FRG, Belgium and Spain. In 1980, Ford made 40% fewer cars in Britain than it did 8 years ago." See (31), 3 February 1981.

10/ As of 1980 Japanese firms accounted for 24% of the imports of the cars into Africa, 54% of all sales in the Middle East, 85% of sales in the Caribbean, 39% in Central and South America, and 78% of imports by DC in the Pacific. See (77).

11/ Where their share has recently been around 22%.

CHAPTER II

1/ In the case of Chrysler the reduction in the number of units representing the break-even point (from 2.4 million in 1979 to 1.9 million in 1982) has been the yardstick for measuring a return to efficient operations.

2/ The growing lead of Toyota over Nissan within the Japanese vehicle market (a gap equal to 13 percentage points of market share in 1982) coupled with Toyota's major projects abroad has launched a fierce battle between the two corporations. See (80).

3/ See (12).

4/ "Ford will in the near future become less of a US company. It will be forced to import engines, transmissions and even completed vehicles from foreign factories as it tries to reduce costs and close the gap between what it can build and what the public can buy." See International Herald Tribune, 9 April 1981. That comment, however, misses the crucial point i.e. who takes the decisions. "As at any time in Ford's long history, all the really important decisions affecting the group anywhere in the world are taken by the main board back in Dearborn, Michigan." See (37), 13 January 1981.

5/ In 1980, 94.3 per cent of all cars produced in Japan had an engine displacement not in excess of 2000 cc. The only other producing country with a similar concentration was Italy. See (83), p. 11.

6/ "In 1976, 99.9% of US production of passenger cars was of vehicles with an engine displacement greater than 2,000 cc, but no other major producing country manufactured even so much as 35% of its passenger cars in this size range." See (11), p. 6.

7/ The *system* size of some of the Japanese groups, however, substantially exceeds that of GM.

8/ See *The Economist*, 7 May 1983.

9/ See (31). The calculated value of world trade in 1981 was around $129 billion.

10/ See (21), p. 17. It went on to express a certain optimism regarding this development: "Large new export markets will gradually open for spare parts, motor vehicle production plant (in particular industrial robots) and technology and know-how... An international division of labour where trade is not limited to finished products alone would make for greater stability. If different stages of production were carried out in different countries, the trade flows would be based on industrial interest in addition to purely commercial interests". *ibid*, p. 27.

11/ See *The Detroit News*, 29 September 1983.

12/ See (67), pp. 780-781.

13/ See (77), p. 71.

14/ The LC bill (HR5133) nevertheless does not give a precise definition of LC since it does not take account of imported raw materials nor does it allow for the fact that placing an order with a US component supplier does not necessarily mean that the item purchased will have been bought in US. "Thus, the true LC of a US built car is probably considerably lower than the figure of about 92% quoted by vehicle manufacturers and government agencies." See (65), p. 44.

15/ The US VER is set at 1.68 million passenger cars. In France the market share is fixed at 3%, as mentioned below in the text, in UK at 10%, while in FRG growth in unit sales is limited to 10% per annum.

16/ See (58), p. 19.

17/ See (22), p. 89

18/ UAW estimates that, comparing average employment levels in 1978 to those in summer/autumn 1983, the percentage changes are all negative: GM, -27.6; Ford, -38.0; Chrysler, -45.8; AMC, -3.5; and VW, -27.6. (Private communication from UAW).

19/ "At the beginning of 1980, 722,000 people worked in the British motor vehicle industry. By May 1983, the total had fallen almost 30% to 516,000. In the economy as a whole, employment over that period fell by 10%; even in manufacturing, the average fall was 22% - much less than in the vehicle industry." See The Economist, 20 August 1983.

20/ "In 1982, GM was sourcing about 80% of its labour inputs from plants with UAW wage agreements. Ford, by contrast, was only sourcing 60% of its needs from such sources. This had led both companies to look more thoroughly for US suppliers whose prices reflect non-union labour inputs." See (77), p. 8.

21/ See (21), pp. 17 and 19.

22/ See (45), p. 41.

23/ For a relentless criticism of the behaviour of the previous Spanish administration in this regard, see (5).

24/ See (21), p. 37.

25/ Ibid, p. 35.

26/ One author has even gone so far as to stress "a need for the establishment of international ground rules to govern what might be 'fair' subsidies for developing nations to international firms to set up 'infant industries'". See (19), p. 32.

CHAPTER III

1/ See (37), 20 July 1982.

2/ See (17), p. 38.

3/ See (3), p. 11.

4/ Ibid

5/ Figures derived from (73).

6/ See (21), p. 16.

7/ See (30), p. 2.

8/ See The Economist, 3 January 1981.

9/ See (37), 30 April 1982.

10/ See (73), pp. 13-14.

11/ See The Economist, 30 January 1982.

12/ See (28), p. 14.

13/ Ibid, pp. 4-5.

14/ See (37), 1 March 1983.

15/ "Most of the major companies have already forged with links with electronics companies for the use and supply of micro-processors to monitor and control car functions. GM has large development contracts with Motorola and Texas Instruments, while Motorola, Ital and Toshiba are building engine models and micro-processor units for Ford, and RCA and Texas Instruments likewise for Chrysler. VW and Daimler-Benz are working with Bosch, Renault has formed a joint company with the US component firm Bendix, Peugeot similarly with Thompson, whilst Fiat has its own subsidiary, Magneto Marelli (with possible future collaboration with SGS). Amongst the Japanese companies Nissan is working with Hitachi, Toyota with Nippondesco and Toshiba, Mitsubishi and Toyo Kogyo with Mitsubishi Electric and NEC and Honda with NEC and Oki Electric... In the above list of tie-ups only Bosch, Bendix, Magneto Marelli and Nippondesco are traditional electrical component manufacturers." See (58), p. 14.

16/ See (28), p. 5.

17/ See (37), 1 March 1983.

CHAPTER IV

1/ See (3), p. 7.

2/ See (41), p. 38.

3/ As recognized in (15), p. 62.

4/ See (37), 26 May 1983.

5/ See (21), pp. 29-30.

6/ See (27), p. 8.

CHAPTER V

1/ See (19), p. 30. In (20) the same author argues "Labour is not a very important element in the production of the major sub-assemblies currently being moved abroad, such a engines. In Japan engines require 3.5 hours or $40 of labour each or less than 5% of total cost". p. 4.

2/ See (15), p. 63.

3/ See (25), pp. 8-9.

4/ See (85), p. 54.

5/ Ibid, pp. 55-56.

6/ See (29), p. 4.

7/ See (37), 26 August 1981.

8/ Ibid, 3 September 1980.

9/ Ibid.

10/ Ibid, 19 October 1982.

11/ Ibid.

CHAPTER VII

1/ See (67), p. 784.

2/ Ibid, p. 781.

3/ See (11), p. 51.

4/ See (73), p. 5.

5/ See (37), 7 December 1982.

6/ Ibid, 22 February 1983.

7/ See (69), p. 12.

8/ See (17), p. 205. The same source reports that "In Argentina 93% of the total foreign investment authorized in the transport equipment sector between 1954 and 1972 was in the form of goods... In Brazil approximately 80% of the $169 million of foreign capital which entered the industry in the installation period between 1957 and 1960 came in the form of imports of machinery and equipment.

9/ For details see (42) and (43).

10/ See (41), p. 12.

CHAPTER VIII

1/ See International Herald Tribune, 26 July 1983.

2/ See (41), p. 26.

3/ See (37).

4/ See International Herald Tribune, 26 July 1983.

5/ Ibid.

6/ Ibid.

7/ See (41), pp. 20-21.

8/ *Ibid*, p. 26.

9/ *ibid*, p. 24.

10/ An article, just published indicates that, due to: (i) the crippling foreign payments crisis which continues in Brazil; (ii) improvement in the engineering characteristics of new engines (a second generation of the alcohol powered variety); (iii) a redjustment of financial incentives in favour of the purchase of such origins; and (iv) continued lobbying from the sugar producers, distillery equipment manufacturers and motor manufacturers, the production and use of alcohol and alcohol powered vehicles is again having a good year, But the same report underlines still more strongly the fundamental points signalled in the present text i.e. (i) the loss of foreign exchange which could have come from sugar exports; (ii) the switch of land away from subsistence production; and (iii) the substantial and persistent subsidies to the programme through the public budget (at a period when the IMF negotiations impose severe restraints on government expenditures). The relevant passages of the article are: "Sugar is rapidly becoming a by-product for Brazil's sugar cane growers and millers, whose most profitable activity is now distilling alcohol... Brazil's earnings from sugar will be around $600 mn this year, about the same as last, and sugar is no longer even in the list of the top ten export products, when in previous decades, it was always one of the first three... This year, three quarter of all new cars sold will be equipped with engines powered by pure alcohol, and the millionth alcohol car made in Brazil was sold in September. As the year draws to a close, more than 90 percent of all new cars are being equipped with alcohol-powered engines, caused by the fear gaining ground that Brazil's deep financial problems could result in a shut-off of imported oil followed by rationing... Critics say the alcohol programme has not been the best way to save dollars. The equivalent of $10 bn. will have been spent on the programme by the time the 10.7 bn. litres goal has been achieved by 1985. For each b/d (barrel per day) saved, about $60 has to be inserted, implying a price equivalent of about $80 a barrel... Should the pressure from the sugar lobby and their allies prevail, and alcohol is used in diesel engines, this would push the cost per barrel well above the $100 mark... As it is, those extra 700,000 hectares now planted to sugar can in Sao Paulo State are lands which were previously used to grow coffee, maize and cotton, or to raise cattle and subsitence crops such as rice, tapioca and abeans. This year, Brazil will have to import maize and rice, at a cost of several hundred million dollars... it could be argued that without the stimulus of a very inflationary programme of stimulating alcohol production, sugar output could have shrunk. Many farmers might have switched to growing other crops, such as soya, citrus, cotton or maize, or raised more cattle. The exports of these might have earned many more billions of dollars than have been saved by the alcohol programme." See (37), 9 November 1983.

11/ See (77), p. 49.

12/ *Ibid*.

13/ See (37), 25 May 1983.

14/ See (9), 18 September 1982, p. 1524.

15/ See (37), 7 December 1982.

16/ See The Economist, 13 August 1983.

17/ Car ownership in Singapore has just been the object of an extremely severe restrictive policy in view of the shortage of space in the country and the other social costs connected with a high density of cars. "Singapore has become probably the most expensive place in the world to own a car. One would be lucky to get much change out of US$ 14,000 for even a small model. Already each car is calculated to need 150 square metres of land, which in Singapore is a palpably finite commodity... 'We can't have a policy where everybody can have a car' said Defence Minister Goh Chok Tong when the first of the latest batch of measures was unveiled.' It is the government's responsibility to provide housing, medical and other social services. It is not our policy to ensure that every family owns a car. That is a luxury.'" See (37), 16 November 1983.

18/ See The Economist, 13 August 1983.

19/ Ibid.

APPENDIX I

Summary of Collaboration Arrangements

Number

1. ALFA ROMEO and FIAT are to jointly manufacture and make joint purchases from third parties of large components to be used in the mid-1980s. Fiat and Alfa will invest a total of about L130 billion ($90m). When the agreement is fully operational, the value of parts swapped between them will be about L100 billion ($70m), plus an extra L50 billion ($35m) of parts bought in jointly from outside suppliers. The net saving should be some 15 or 20%. Alfa will look after rear suspension, motor chassis and front well attachment equipment. Fiat will be responsible for gearboxes, brake discs and steering rods.

2. ALFA ROMEO and DAIHATSU have signed a licensing agreement for the production of Daihatsu 'Charade' models at the Alfa Romeo plant at Brits, Pretoria. Production is scheduled for September 1983 and entails an investment of R20m ($17.2m). The venture will create 1,000 new jobs.

3. ALFA ROMEO and NISSAN have created a joint company. Alfa Romeo Nissan Autoveicoli (ARNA) for the manufacture of cars in Italy from the 2nd half of 1983. The vehicle will be a 'super-mini' and 60,000 a year will be built, of which half will be exported to European countries. The ARNA cars will use Alfa Romeo engines and transmissions and Japanese body panels. Around 80% by value will be local content.

4. ALFA ROMEO (5%) and FIAT (95%) are joint owners of SOFIM, making diesel engines at Foggia in Southern Italy. Capitalization is L30 billion ($28m). Sofim produces 2 litre and 2.5 litre engines, mainly used in Fiat 131 and 132 models. Renault once owned 24.5% of the company, but sold their share to Fiat, although Renault still purchases diesel engines from Sofim for use in the "Master" commercial vehicles.

5. ALFA ROMEO took over a portion of the FIAT operations in South Africa and continued manufacture and distribution of the Fiat 128 light commercial truck. Alfa also took over up to 130 of Fiat's dealers.

6. SIEMENS (85%) and ALLIS-CHALMERS (15%) are joint owners of Siemen-Allis, based in Atlanta and manufacturing a range of power engineering products, including electric motors and generators, switchgear and power electronics and control systems.

7. FIAT (87%) and ALLIS CHALMERS (13%) are joint owners of Fiat Allis, manufacturers of construction machinery. Allis-Chalmers has begun a court action to liquidate Fiat-Allis, but Fiat has opposed the move and is taking the matter to arbitration in Switzerland.

8. ALLIS-CHALMERS markets TOYOSHA 25hp and 31hp tractors in North America in its own livery.

9. ALLIS-CHALMERS sell MITSUBISHI engines in North America under licence.

10. ALLIS-CHALMERS and DEMAG have an agreement for joint manufacture of open cast mining equipment.

11. AMERICAN MOTORS is 46.6% owned by RENAULT who have injected $400m into AMC over 3 years. AMC now produces the Alliance, an Americanized version of the R9, and also distributes other Renault models through its dealer network. Renault imports AMC Jeeps into Europe, equipping them with 2 litre diesel and 1.6 litre engines supplied by Renault.

12. AMERICAN MOTORS FINANCIAL CORPORATION has entered into agreements with CHRYSLER FINANCIAL CORPORATION and VW CREDIT INC., to provide each other with a broad range of services related to automotive financing.

13. RENAULT has taken a 5% holding in VAMSA, an AMC subsidiary, and plans include production of 50,000 R9s a year from 1983.

14. BAJAJ AUTO and KAWASAKI are expected to commence joint production of motorcycles in India from early 1984.

15. BENDIX is to market production systems in North America for COMAU through a company that is to be jointly owned (90% Bendix, 10% COMAU). Bendix is also to take a 30% stake in COMAU, which is currently wholly owned by FIAT.

16. RENIX ELECTRONIQUE is a jointly owned company manufacturing electronic car components near Toulouse. The plant cost FFr80m ($18.5m), employs 450 and is owned by RENAULT (51%) and BENDIX (49%).

17. B.L. and HONDA have a number of collaborations in progress. B.L. is manufacturing the Honda Acclaim in the U.K. and is distributing the models throughout Europe. Project XX is the projected replacement for the Rover and is planned for 1985, and it is believed that B.L. is to build a Honda-Civic type car at Longbridge, where spare capacity exists. In existing deals, most of the components are shipped from Japan for final assembly in the U.K.

18. B.L. is marketing HONDA QUINTETS in Australia as Rover Quintets. Honda is filling its quota for imports into Australia whilst B.L. are falling short of their import quota by 2,000 vehicles a year. By putting a Rover badge on the Quintets they count against the B.L. quota.

19. B.L. Has signed a joint contract with PERKINS ENGINES to develop two high speed direct injection diesel engines, based on the 2 litre 'O' series engine currently fitted on the Sherpa Van. The engines are likely to be offered in Austin Rover vehicles from 1985, but would be marketed to third parties worldwide by each company. Components - will be manufactured at Longbridge and then transferred to Perkins for assembly.

20. B.L. TECHNOLOGY has a collaboration programme with LUCAS RESEARCH CENTRE on application of CVTs in passenger cars.

21. B.L. is to manufacture CUMMINS Family 1 engines at Leyland Bathgate. Leyland will buy Cummins technology for 70hp to 160hp engines and produce up to 40,000 a year by 1990. Leyland will supply Cummins Industrial equipment customers in Europe. Cummins will build the engines in the U.S.

22. B.L. is to produce SUZUKI small four-wheel-drive vehicles in Spain, at the Land Rover factory at Linares. Production should start in early 1984 at 10,000 units per annum initially. B.L. already assemble Suzukis in Kenya.

23. B.L. is fitting ISUZU 4 cylinder, 97bhp diesel engines to Land Rovers built in Australia.

24. B.L. Land Rovers are to be produced in Yugoslavia from late 1983 by FTV. A plant at Ivangrad, Montenegro, will build up to 5,000 under license.

25. B.L. has an agreement with VOLKSWAGEN for the supply of Golf GTi five-speed gearboxes for the new LM10 family of cars.

26. B.L. assembles the MITSUBISHI Canter range of trucks at Leyland Niveria.

27. B.L. and RENAULT are discussing the production in South Africa of a new Renault vehicle at Leyland South Africa. Dependent on Toyota's ability to meet Renault requirements, B.L. may assemble a range of Renault cars and commercial vehicles.

28. B.L. and PEUGEOT have signed a deal by which B.L. Australia assembles and markets the Peugeot 505 in Australia. This move follows the decision by Renault to cease activities in Australia. The vehicles are built at Enfield, New South Wales.

29. HINO bus bodies are produced by B.L. in Australia through a Leyland subsidiary, Freightliner Industries Limited.

30. DAIHATSU light commercial are marketed in Australia by B.L.

31. B.L. manufactures ZF gearboxes under licence, through Leyland Vehicles. The S6-36 synchromesh box is being produced for installation in a range of 12 to 24 ton trucks at Bathgate, commencing 1983.

32. B.L. and ROLLS ROYCE have formed a joint venture company to design and build transmissions for tracked military vehicles. The company is Trackpower Transmissions and the main customer is expected to be GKN Sankey.

33. B.L. and SAAB-SCANIA each own 20% of SISU with the Finnish state holding the balance of the shares. Vehicles from 6 to 16 tonnes are manufactured with both companies supplying components and marketing the vehicles, mainly in European markets.

34. B.L., FIAT, PEUGEOT, RENAULT, VOLKSWAGEN and VOLVO are all members of the Joint Research Committee, set up to examine advanced long term research covering combustion technology, corrosion, surface treatment, motor vehicle batteries, quality control, computerized engineering methods and properties of new materials.

35. BMW is negotiating with GKN concerning the establishment in the U.K. of a components plant.

36. BMW assumed 100% of the BMW-Steyr diesel engine factory when Steyr were unable to meet their side of the $300m venture agreement. However, BMW did agree to form a new joint development company to work on Steyr's ambitious direct-injection four-and-six-cylinder engines.

37. BMW has contracted to supply FORD of the US with up to 190,000 diesel engines from the BMW-Steyr project. Deliveries of the 6 cylinder, 2.4 litre turbocharged engines should commence in 1983 and the order is worth $90m.

38. BORG-WARNER is a partner with AISIN SEIKI in a motor components company in Japan which turns out 700,000 automatic transmissions a year for Toyota. Aisin-Warner was formed as a 50/50 joint venture, but at a request from Aisin, Borg Warner has sold 40% of the holding to the Japanese partner. Borg Warner will continue its licence agreement with Aisin for another ten years.

39. FIAT, VANDOORNE TRANSMISSIE and BORG WARNER jointly produce continuously variable transmissions in Holland for sale to third parties, in addition to Fiat's requirements for the Ritmo.

40. BORG-WARNER and ISHIKAWAJIMA-HARIMA HEAVY INDUSTRIES have set up a joint venture company to market turbo chargers for cars in North America.

41. ROBERT BOSCH owns 9.3% of BORG-WARNER and is represented on the board. BOSCH engineered the move with future co-operation in mind, particularly with regard to Bosch electronic control systems being applied to Borg-warner's automatic gearbox technology.

42. ROBERT BOSCH and TORAY ENGINEERING of Japan have jointly founded a company called Robert Bosch Packaging machinery in Tokyo. Bosch provided 66% of the Y600m ($2.5m) start-up capital. Packaging machinery assembly and production, mainly for the pharmaceutical, cosmetic, food and produce industries will commence in 1983.

43. CATERPILLAR and MITSUBISHI jointly produce construction equipment in Japan through a company called Caterpillar-Mitsubishi.

44. ALFA ROMEO AR8 vans are the same design as the FIAT Daily Van, have been jointly developed and are now produced by Iveco.

45. LUCAS and CHLORIDE have a joint company, Lucas Chloride EV Systems Ltd., established to develop and market high performance electric vehicles. The companies have combined with RELIANT MOTORS to produce a hybrid car incorporating electric drive and an 848cc Reliant engine.

46. CHRYSLER vehicles are produced in South Africa by SIGMA MOTORS, a subsidiary of Anglo American. Until early 1983 Chrysler were 25% shareholders in Sigma, but sold their share to Anglo American, who now control 100%.

47. CHRYSLER has an agreement with the Government of Jamaica whereby the American company exchanges vehicles for supplies of alumina.

48. CHRYSLER has a 14.4% shareholding of PEUGEOT of France and purchase 1.6 litre engines for fitment into Horizon, Omni and derivatives. The Peugeot engines are intended to replace the 1.7 litre engines that Chrysler are now phasing out, and which have been supplied by VOLKSWAGEN. Peugeot is also to supply 450,000 1.9 litre diesel engines between late 1983 and 1986.

49. CHRYSLER has a $222m venture with PERKINS ENGINES to convert Chrysler's petrol engine factory at Windsor, Ontario, to light, high-speed diesel engine production by late 1984. Chrysler is contributing assets, cash and prior research worth $163m for which it gets 97% of the equity. Perkins provides prior research and development valued at $4m and receives 3% of the equity with an option to increase its take to 25% by 1986. Perkins also retains worldwide marketing rights for the new engines. Another $55m in financing has been arranged through loans guarantees provided by the Canadian federal and Ontario provincial governments.

50. CHRYSLER owns 15% of MITSUBISHI MOTORS with Mitsubishi Heavy Industries holding 85%. Mitsubishi supply engines and Chrysler markets Mitsubishi models through its dealer organization.

51. CHRYSLER has a non-exclusive worldwide right from HONDA to make, use and sell Honda's compound Vortex controlled combustion engine.

52. CUMMINS ENGINES and J.I. CASE have announced formation of an unincorporated joint venture to manufacture a new line of advanced design, fuel efficient diesel engines in the 40 to 250 hp range. The two firms share equally the estimated $350m investment required by 1986. Market introduction is scheduled for 1983. Case will instal the engines in its construction and agricultural equipment whilst Cummins will sell to other manufacturers of similar equipment, plus commercial vehicle producers.

53. CUMMINS (40%) shares in a joint venture with DIESEL NACIONAL SA (60%) to produce NH engines between 190 and 420 hp and K engines between 450 and 1600 hp. Plant construction commenced in 1980 and is scheduled to commence production in 1983. DINA already make V engines under licence. Marketing of the new engines will also be handled jointly.

54. DAEWOO CORPORATION and GENERAL MOTORS have a joint venture automobile manufacturing company in South Korea. The company was renamed Daewoo Motor in January 1983 (from Saehan Motor) with GM retaining 50% holding but ceding control to Daewoo. The company produces cars, trucks and buses.

55. The Societe Europeene de Travaux et de Developpment, known usually as the Club of Four was established in the 1960s by DAF, SAVIEM, VOLVO and MAGIRUS DEUTZ. The arrangement has been confused by the combination of Saviem with Berliet to form the RENAULT company RVI, and Magirus Deutz was absorbed by FIAT. The consortium still functions and meets every 6 to 8 weeks.

56. INTERNATIONAL HARVESTER holds 37.5% of DAF TRUCKS, along with VADO (The Van Doorne family) 37.5% and Dutch State Mines 25%. IHC is attempting to sell its shares back to the other shareholders but they in turn are insisting that IHC find a third party to take over their holding.

57. DAF has an agreement to supply truck cabins and chassis girdles to the Hungarian industrial group, RABA, originally for a five year period 1980-85.

58. DAIHATSU is supplying INNOCENTI with up to 150,000 3 cylinder 1 litre engines and is marketing through its European dealer network up to 60% of Innocenti output.

59. DAIHATSU has agreed to remodel a mini truck plant in Shenyang, Liaoning Province, China by providing equipment, parts and technological know-how. In return, Daihatsu receives oil, coal oil, coke and cotton yard goods.

60. DAIHATSU and TOYOTA both have contracts for emission control technology sharing with SUZUKI.

61. TOYOTA has a shareholding in DAIHATSU, and the two companies have been linked since 1967.

62. DAIMLER-BENZ owns 40% of SAURER and 49% of FBW. The companies have restructured the Swiss commercial vehicle industry through formation of a new company called Nutzfahrzeuggesellschaft Arbon and Wetzikon. NAW takes over the engineering and production facilities of Saurer and FBW, with Saurer holding 45%, Daimler-Benz 40% and FBW 15%. Plans for the rationalization of vehicle assembly at Arbon and Wetzikon envisage that only models which cannot be sourced directly from Daimler-Benz production will be assembled. This applies to trucks and buses.

63. DAIMLER-BENZ is a 36% shareholder in OMTOMARSAN, manufacturing buses in Turkey under licence.

64. TUMOSAN holds licences from DAIMLER-BENZ, FIAT, VOLVO and MITSUBISHI for the production of a wide range of diesel engines, probably at a factory that has been built in the south of the country. Daimler-Benz has been approached to take a stake in the diesel engine enterprise.

65. STEYR-DAIMLER-PUCH of Austria have bought out the 50% shareholding of DAIMLER-BENZ in the joint company GFC, after the company failed to meet sales targets for four-wheeled-drive, rough terrain vehicles. However, Steyr continues to build the vehicles on a contract basis and Daimler-Benz remains responsible for research and development.

66. DAIMLER-BENZ has a 26% holding in UNITED CAR and DIESEL DISTRIBUTORS of East London, which company enlarged its assembly plant to cater for assembly of the HONDA Civic range of cars in South Africa. Some 12,000 a year vehicles are to be built, from 1982, with 60% local content. Honda supply engines, transmissions and body dies.

67. DAIMLER-BENZ has raised its holding in MEVOSA to 52% and has assumed control of the company. INI, the Spanish state holding company, holds around 45% with the balance of shares being held by local banks. The company produces commercial vehicles and diesel engines.

68. DAIMLER-BENZ and MAN share diesel engine production facilities and components for a range of 4,5, V-6, V-8 and V-10 engine blocks and crank shafts. There is a joint ownership of MTU-Friedrichshafen, plus there is collaboration in truck manufacturing and marketing.

69. DAIMLER-BENZ and VOLKSWAGEN are joint owners of DAG, Deutsche Automobilgesellschaft mbH covering research and development in the field of electric power.

70. FAP-FAMOS produces trucks from 9-22 tonnes in Yugoslavia in collaboration with Daimler-Benz. There is also joint assembly in Ghana. Daimler-Benz receives components as part of a buy back agreement.

71. DAIMLER-BENZ and PERKINS ENGINES are co-operating in the construction of a factory near Cape Town for the production of 50,000 diesel engines a year. The investment cost is $370m and production is scheduled for 1984.

72. DAIMLER-BENZ and the WESTINGHOUSE AIRBRAKE COMPANY of Hannover (WABCO) have formed a joint venture for the development of the ABS, heavy truck Antilock Braking Systems.

73, DAIMLER-BENZ and IVECO (FIAT) are principal partners in a joint venture to produce automatic transmissions (ATU) which company may also be joined by VOLVO and ZF.

74. DAIMLER-BENZ 'Unimog' 4-wheel-drive tractors are marketed in the USA by J.I. Case.

75. LUCAS GIRLING of the U.K. and the DAYTON WALTHER CORPORATION of Dayton, Ohio, are to establish a joint company in the USA to manufacture truck brakes for the North American market. The company will be called Lucas Girling Walther and the initial product line will include Dayton-Walther design hydraulic disc brakes and complementary Lucas Girling type rear drum brakes for the medium truck sector.

76. YANMAR (51%) and DEERE (49%) have an agreement for technical and commercial co-operation via Yanmar John Deere Engineering. Yanmar 26hp and 33hp tractors are marketed in North America in Deere livery.

77. DUCELLIER is owned by Lucas (50%) VALEO (48%) and a French bank 2%. Lucas Electrical sought backing from both French and British governments to finance the introduction of a new range of lightweight starter motors which offer fuel economies.

78. IVECO (FIAT) and EATON are to produce a joint range of medium and light duty transmissions for European and world markets from 1985. Costs will be split equally between the two partners. The companies will produce a new family of single countershaft, synchromesh gearboxes with torque ratings from 407Nm (300lbft) to 814Nm (600lbft) and five to nine speeds. Iveco will use its Bresica, Italy plant for production whilst Eaton will use spare capacity at Basingstoke in the UK.

79. EATON Corporation and SUMITOMO HEAVY INDUSTRIES are joint partners with an as yet unknown partner (possibly JUNGHEINRICH) in a new company, 'Yale Materials Handling', to produce fork lift trucks at Eaton's plant in West Germany.

80. EATON AXLES LTD., (a U.K. subsidiary) has entered into a joint venture with WHEELS INDIA LTD., and SANDURAM FINANCE LTD., for the production of axles for medium-heavy and heavy trucks in India. Production commences 1982.

81. ERF is expected to commence production under licence of HINO light and medium range trucks. The vehicles will be produced and marketed by ERF to supplement its current range of heavy trucks. The move also allows HINO to avoid any import restrictions and to gain access to European markets normally closed to Japanese imports.

82. LANCIA (FIAT) and SAAB have jointly developed a four-door notchback, called the Type-Four, and the vehicle is scheduled for showing at the 1984 Turin show. A further connection involves ALFA ROMEO who are building a separate vehicle on the Type Four platform, but with their own shape, power train and suspension. Saab market Autobianchi models as well as Lancia in Scandinavia.

83. COMAU (FIAT) is taking a 10% stake in a new marketing company being set up in the US to handle the sale of automated production systems and robots. BENDIX will hold 90% of the marketing company and is also to take a 30% stake in COMAU itself.

84. FIAT and PEUGEOT jointly developed and produce the Ducato van at Sevel in Italy. Vehicles are produced under both marques and are marketed separately.

85. FIAT and PEUGEOT are planning joint production of one million a year one-litre engines from components supplied on a 50/50 basis. The engine development has reached the industrialization stage and is probably intended for new versions of the Fiat Uno and Peugeot 205.

86. PREMIER AUTOMOBILES (PAL) has an agreement with FIAT for designs and dies for the Fiat 124 and a technical co-operation agreement has been signed with IVECO for the production of 8 1/2 tonne trucks.

87. IVECO is to take management responsibilities for a new company jointly owned with ADOLPH SAURER (holding 40% each with 20% held by Swiss Companies) to develop Saurer's diesel-engine operations. The Saurer research team is being integrated into the IVECO system. First jointly produced engines will be for light commercial vehicles, but car diesels are also to be developed.

88. FIAT has formed a 50-50 joint venture company called Technamotor with TECHUMSEH PRODUCTS of the US to develop and produce a range of two-stroke and four-stroke motors.

89. The FIAT subsidiary Semelco has an agreement with the Italian subsidiary of MOTOROLA for the supply of electronic semi-conductors.

90. PEUGEOT cars are built in Argentina under licence by Sevel (FIAT). Peugeot were joint owners in the company, but withdrew in 1981.

91. IVECO and ROCKWELL have signed an agreement for the establishment of a joint venture to manufacture and market Rockwell designed heavy duty truck axles for Europe, North Africa and Middle East. The company is Rockwell CVC/OMEVI SpA and took over the Iveco plant at Cameri. Production commences 1983.

92. FIAT gave up its stake in SEAT but Fiat models are still to be produced under licence until 1985.

93. FIAT derived models are produced in Poland under licence by POLMOT. A jointly designed multi purpose vehicle with commercial or agricultural uses is also produced. Poland is the only source of the Fiat 126.

94. FIAT models are produced under licence in Yugoslavia by ZASTAVA. Initial agreements covered production of the Fiat 128, but light van production was also covered by agreements.

95. FORD has a 25% stake in TOYO KOGYO. Mazda models are produced by TK for distribution as Ford variants in a number of countries, particularly Australasia and the percentage of Mazda production to be badged as Ford's is to rise to 20% by 1984 from 13-14% in 1982.

96. FORD has signed a deal with MITSUBISHI for the supply of 225,000 diesel engines for light trucks in the mid-1980s. The deal involves 4-cylinder 2.3 litre turbo-charged engines and Mitsubishi will supply Ford with 75,000 a year for a three year period.

97. FORD (40%) has established a 15,000 a year tractor plant in Mexico with Nacional Financiera, the state development bank. Production commences in 1984.

98. SANDBACH ENGINEERING (a subsidiary of PACCAR) took over production of the Ford Transcontinetal heavyweight truck, following the closure of Ford's Amsterdam truck building facilities.

99. INTERNATIONAL HARVESTER are to supply FORD with 6.9 litre diesel engines for use in Ford's 1983 model heavy duty pickup trucks and vans. The deal worth $500m will last for 5 years.

100. SHIBAURA 13, 16 and 28hp tractors are marketed in FORD livery in North America and Europe.

101. FORD signed a three year agreement with HONDA for the supply of 72,000 a year aluminium engine cylinder heads. Ford supply the aluminium ingots needed for head castings.

102. PEUGEOT supplies FORD with diesel engines for the Granada and the Sierra.

103. Ford trucks are assembled at Bauchi by STEYR-NIGERIA.

104. HYUNDAI markets FORD vehicles in South Korea.

105. RENAULT supplies cabs for FORD Transcontinental trucks.

106. CLAAS combine harvesters are marketed through the Ford North American dealer network.

107. GEC ELECTRICAL PRODUCTS has entered into a licencing agreement to produce HITACHI industrial robots. Robots to be produced cover spraying and arc-welding functions. GEC will market Hitachi robots throughout Europe.

108. GENERAL MOTORS and TOYOTA have negotiated a 12 year agreement covering the production of 200,000 a year cars in the US. The cars will be built at a GM plant at Fremont, California starting late 1984. A small front-wheel-drive model will be produced and marketed by Chevrolet. Body, seats and most of the trim will be produced in the US. A joint 50-50 company is being formed, with Toyota selecting the president.

109. GENERAL MOTORS has negotiated a barter deal with the Jamaican Government for the supply of alumina (refined bauxite) in exchange for vehicles.

110. GENERAL MOTORS has a 34.2% interest in ISUZU and the two companies have several joint ventures in operation, including assembly of vehicles in Tunisia and the Philippines, plus GM markets Isuzu models under the Bedford marque in many countries. Isuzu has placed a $200m six year convertible debenture on GM, the proceeds of which are being used to expand Isuzu's plant to produce, from 1984, sub compact passenger cars jointly developed by Isuzu and GM. Three models from 1300 to 1500cc are planned at 200,000 and 300,000 units a year, GM taking two-thirds of output.

111. GENERAL MOTORS bought a 5.3% equity stake in SUZUKI, who then exchanged 10 million shares with ISUZU. It is likely that Suzuki will concentrate on micro-vehicles, thus aiding GM in producing a complete range of vehicles in every compartment.

112. GENERAL MOTORS has signed an agreement with three Taiwan companies and a bank to produce heavy duty trucks, buses and diesel engines. GM hold 45% of Hua Tung Automotive Corporation with Taiwan Machinery Manufacturing 34% and other local companies providing the balance of the $120m investment.

113. Detroit Allison, a GENERAL MOTORS subsidiary, has licenced ROLLS ROYCE MOTORS to make DDAX300 cross drive transmission systems for military vehicles.

114. GENERAL MOTORS has a technology sharing agreement concerning rotary engines with TOYO KOGYO.

115. TOYO KOGYO buys body shells for its largest cars from GM-Holden.

116. HINDUSTAN is to sign an agreement with ISUZU for the manufacture of 1.8 litre engine for its cars as well as a complete power train, including drive axles, gear boxes and differentials.

117. HINDUSTAN produces GM's Bedford Trucks and buses under licence in India.

118. HINO and VOLVO have reached agreement about local assembly of large trucks in Morocco. A plant is being built for production of 500 units a year of Volvo 10 tonne and Hino 6 tonne trucks.

119. HINO is a member of the TOYOTA group.

120. LANCING markets HITACHI multi-purpose robots in the U.K.

121. HONDA is to produce motorcycles in Spain under a technical agreement with MOTOCICLETAS MONTESA. Motorcycles of less than 100cc are to be produced for distribution in Europe.

122. HONDA has signed an agreement with CYCLES PEUGEOT whereby two types of two-stroke engine are to be manufactured in France by the Peugeot subsidiary, for Honda mopeds being assembled at the Honda Benelux plant in Belgium. Cycles Peugeot is also to produce a scooter with either 50cc or 80cc engines, under licence from Honda, for marketing in Europe.

123. HONDA has established a joint venture with the permission of the Yugoslavian Government for the production of 150,000 a year farm engines and pumps in conjunction with STANDARD METALSKA INDUSTRIA.

124. HONDA has signed an agreement with WOLSELEY WEBB for the joint development of powered lawnmowers.

125. MITSUBISHI MOTORS and MITSUBISHI CORPORATION have jointly acquired a 10% interest in HYUNDAI. The Japanese companies are investing $7m and are continuing to supply technology and executives as part of Hyundai's expansion programme. Mitsubishi has provided engine technology since 1973.

126. ISUZU and GENERAL MOTORS have reached an agreement to jointly produce 1,400 pa. trucks and buses in Egypt from 1984, with parts supplied from Japan. Production should rise to 16,500 units in 1987 and 18,000 in 1989 with 40% of parts supplied from within Egypt. GM will hold 31%, Egyptian interests 20% and the balance by Saudi Arabian and Kuwaiti financial groups.

127. INTERNATIONAL HARVESTER machines are produced in Poland at the Huta Stalowa Wola Works, Production began in 1972 and the agreement has been extended to run until 1987. A joint marketing company, Cetco, was formed with Bumar Foreign Trade Enterprise of Poland to concentrate on markets where the Polish or US firms find difficulty operating independently.

128. INTERNATIONAL HARVESTER has signed a 10 year technical assistance and supply agreement with Diesel Nacional of Mexico. IHC supplies technical assistance, components and parts and allows DINA to use certain IH patents. In return IH receives technical assistance fees on each DINA truck sold, as well as revenues from components sold to DINA.

129. INTERNATIONAL HARVESTER has a 40% stake in FABRICA de AUTOTRANSPORTES MEXICANA SA (FAMSA) engaged in the production of heavy trucks.

130. INTERNATIONAL HARVESTER has a 40% holding in ENASA. Financial pressures on the company have forced it to suspend ambitious plans for an engine production plant in Spain.

131. ISUZU is helping to modernize China's Nanking truck factory and produces major components there under a joint venture deal. There is joint production of engines and transmissions. ISUZU receives royalties for Chinese production of key parts for a two-ton diesel truck.

132. DEUTZ-FAHR (a KHD subsidiary) has bought the 29% holding in STEIGER TRACTORS from INTERNATIONAL HARVESTER.

133. DEUTZ has a 40% holding in MITSUI-DEUTZ in partnership with the MITSUI CORPORATION.

134. KOMATSU and CUMMINS have a manufacturing agreement for engines and components.

135. LADA has produced FIAT models under licence since 1971. Capacity is 750,000 units per annum.

136. PORSCHE has assisted LADA in the redevelopment of Fiat models, facelifts to appear in 1983. Porsche is also said to be developing air-cooled diesel engines, to be built at the Gorki automobile works as well as a Wankel engine of between 90 and 160hp and a car body plant to produce the Lada.

137. LOTUS and TOYOTA have a long term agreement covering engineering development and the supply of gearboxes, differentials, door locks and brakes for the Lotus Eclat. Toyota is also to supply the engine, gearbox and other items for a two-seater sports car due in 1985.

138. LUCAS and SMITHS INDUSTRIES are co-operating in the development of a complete range of vehicle ignition electronics for fuel systems, vehicle conditioning monitoring, instrument systems and displays, sensors and transducers.

139. LUCAS has two agreements on supply and technology of electronic components with MOTOROLA of the US. Motorola is to provide Lucas with design rule information on its linear integrated circuit process. This will enable Lucas to design custom microchips, which it can either make itself in Birmingham, U.K. or can be made by Motorola at Toulouse, France. In return Motorola is to become the prime supplier of semiconductor devices to Lucas.

140. TRW has an agreement with LUCAS CAV whereby the company is to design and manufacture microprocessor control unit for use with a new generation diesel fuel injection system under development by the British firm.

141. RENAULT has a 20% holding in MACK TRUCKS, a subsidiary of Signal Industries. RVI makes medium trucks in France with diesel engines for distribution in the USA with Mack badges. RVI also markets some Mack Trucks in Europe, particularly in the U.K. Mack are assisting Renault on the development of engines, gearboxes and axles.

142. MACK TRUCKS are assembled in South Africa by SIGMA until recently 25% owned by Chrysler, but now 100% Anglo American.

143. PEUGEOT is supplying manufacturing technology for diesel engines to MAHINDRA and MAHINDRA. An investment of $20m was required and output is scheduled at 25,000 pa.

144. MAHINDRA and MAHINDRA manufacture Willys jeeps in India under licence from AMERICAN MOTORS.

145. MAN of West Germany has taken an equity stake in B and W Diesel of Denmark, at a cost of DKr 300m ($37m). MAN also provided DKr 50m ($6m) of working capital to help B and W Diesel in its development of low speed two-stroke engines.

146. MAN has an unlimited co-operation with PURE DRINKS LTD., of New Delhi whereby the Indian company will build five and six cylinder in line diesel engines under licence for trucks and industrial purposes.

147. MAN and VOLKSWAGEN jointy produce and market a range of medium trucks, from 6 tonnes to 9 tonnes. Target production is 14,000 a year.

148. HYUNDAI negotiated a fifteen year licence in 1977 with MAN of West Germany under which Hyundai Heavy Industries and Hyundai Shipbuilding is licensed to build and market MAN two-stroke and four-stroke engines for ships and stationary equipment.

149. MAN supplies RENAULT with engines, but forbids Renault from selling competing trucks in MAN's own markets.

150. MASSEY-FERGUSON has a joint venture tractor manufacturing operation in Mexico, called Agromak. The main partner was GRUPO ALFA but this company has recently sold its share to an unknown purchaser.

151. IMT of Yugoslavia produces 35hp tractors under licence from MASSEY-FERGUSON. Around 40,000 units a year are produced but distribution has been restricted to countries where Massey do not themselves manufacture or market 35hp models. Now that Massey-Ferguson has dropped the MF35, IMT models are being sold in more European markets.

152. MASSEY-FERGUSON has a joint venture tractor assembly company. Saudi Tractor Manufacturing, established at Jeddah in conjunction with its local distributors, E.A. Juffali.

153. MASSEY-FERGUSON negotiated a £200m ($350m) deal with URSUS of Poland for the creation of a modern integrated tractor and engine (through Perkins) manufacturing plant. Plans called for 75,000 MF tractors and 90,000 Perkins engines a year to be built from 1981. Currency problems resulted in severe delays and it is not expected that output will assume any considerable volume before 1986.

154. MASSEY-FERGUSON markets TOYOSHA tractors in the 20hp to 31hp range in North America in its own livery.

155. MASSEY-FERGUSON purchase MITSUBISHI mini-tractors for distribution in its own livery, mainly in North America but also in Japan and France.

156. MATRA produces up to 20,000 cars a year, the Rancho and Murena. Peugeot had a 45% stake in the company, but has recently withdrawn, although it is to continue to market the two vehicles until they are replaced.

157. MATRA is to build a new car in conjunction with RENAULT, who will take no financial stake in the venture but will provide major parts and components.

158. MITSUBISHI has signed a letter of intent to set up a car manufacturing operation in partnership with HEAVY INDUSTRIES CORPORATION of Malaysia. The deal involves production of a four door saloon, with a four door hatchback to follow in 1988. The project will cost $225m with HICOM taking 70% of the equity and Mitsubishi 30%. Capacity at the new plant, to be built at Shah Alam, will be 80,000 units a year rising to 120,000 by 1990. Initially, local content will be 36%.

159. MITSUBISHI vehicles are produced in South Africa by SIGMA MOTORS, once 25% owned by CHRYSLER but now 100% owned by ANGLO AMERICAN CORPORATION.

160. MOTOBECANE has marketing agreement with YAMAHA and there is provision for joint development and production of mopeds, subject to Motobecane surviving having filed for bankruptcy and endeavouring to restructure.

161. NISSAN have a 54.6% holding in MOTORIBERICA and is restructuring the company and its product range. Production of the Datsun Patrol has commenced and should reach 5,000 in 1983. Output in 1984 will rise to 15,00 and the Vanette will also be introduced in 1984, also to rise to 15,000 p.a. Motor Iberica continues to produce its own commercial vehicles and tractors. Nissan originally bought out the MASSEY-FERGUSON stake in the Spanish company and MF tractors are still built under licence.

162. STANADYNE and MOTOROLA have an agreement for the joint development and production of electronic controls for fuel-injection equipment.

163. WESGLAS is a joint company established at Hophutha Tswana to manufacture laminated and tempered glass for motor cars. It is jointly owned by Messina (NISSAN), Wesco (TOYOTA) and Anglo-American Industrial Corporation (PEUGEOT and TOYO KOGYO). Capital for the venture is $25m.

164. NISSAN and MARUBENI CORPORATION have each acquired 15% in Philipinas Nissan, a car assembly and marketing company. Production of Nissan cars will commence at 150 a month in 1983, rising to 350 a month by early 1984. DMG INDUSTRIES holds the 70% majority stake.

165. NISSAN has signed a long term technology exchange agreement with MARTIN MARIETTA of the US. This agreement allows for Nissan to expand its aerospace and defense related activities and provides for diversification from the automotive industry.

166. Nissan has entered into a technical agreement with HYDERABAD ALLWYN METALWORKS for the manufacture of 10,000 light commercial vehicles a year. The project involves an investment of Rs 200m ($22m) over a period of 5 to 7 years. Nissan will transfer its latest technology for the manufacture of LCVs, including the Capstar series. Allwyn will be allowed use of the Nissan brandname, except in countries where Nissan already has collaborations or production facilities.

167. NISSAN and VOLKSWAGEN are co-operating in all fields of production and marketing. Nissan is to build the VW Santana in Japan commencing October 1983 at 60,000 pa. VW supply engines, gearboxes and chassis parts. The vehicles will be distributed by Nissan in Japan and Volkswagen elsewhere. There are plans to raise production to 180,000 pa. dependent on demand.

168. NISSAN (65%) and TOYO KOGYO (35%) are joint owners of the Japanese Automatic Transmission Company. Nissan bought out Ford's majority holding in the company in 1982.

169. The Akebono Brake Company is jointly owned by NISSAN 15.1%, BENDIX 19.4%, TOYOTA 18.6%, ISUZU 7.6% and HINO 3.5% the balance being held mainly by banks.

170. BOSCH has an 8.8% holding in NIPPONDENSO, which is member of the TOYOTA group.

171. DIESEL KIKI is licensed by BOSCH to produce FIE and supplies to Nissan. NISSAN own 11.2%, BOSCH 8% and ISUZU 17.9%.

172. FUJI HEAVY INDUSTRIES, manufacturers of the Subaru range of cars, is a member of the NISSAN group.

173. PERKINS ENGINES has an agreement with BULCANCARIMPEX to reconstruct and expand the Bulgarian diesel engine industry. Perkins engines are built under licence and there are plans to jointly develop a family of multi-purpose diesel engines for forklift truck and industrial applications.

174. PEUGEOT and RENAULT are joint owners of KARRIER MOTORS producing commercial vehicles in the U.K. and Spain at what was Dodge Europe. Renault bought a 50% share of the company in late 1981 and Renault is shortly to take over 100% control of Karrier though the current product mix will remain for the foreseeable future.

175. PEUGEOT has signed a joint venture agreement with six Indonesian companies to build a $109m gearbox factory in West Java.

176. SAAB-VALMET assembles Alpine, Solara and Horizon models in Finland for the Talbot division of PEUGEOT. Saab-Valmet markets and distributes the vehicles throughout Scandinavia.

177. OLTCIT is a joint venture company in Rumania involving the Citroen division of PEUGEOTSA. An agreement was signed in 1975, but numerous delays effected plans for 7 years. The Oltcit operation involves production of a Citroen designed car at a French designed factory at Craiova, costing $1.4billion, shared equally by Citroen and a semi-public corporation in Rumania. The deal also involves French Government credit grants of $250m so Rumania can buy French made gearboxes, universal joints and smaller components to 40% of the Oltcit car, by value. Initial production will be for Eastern bloc countries, but up to half of the 120,000 pa. target is intended for the West. Citroen has a 31.7% holding in Oltcit.

178. PEUGEOT, through Cycles Peugeot, has a co-operation agreement with PIAGGIO of Italy, involving a 125cc motorcycle, jointly designed and using a Peugeot frame and a Piaggio engine. The vehicle is called Peugeot-Gilera.

179. PEUGEOT is involved with GLAENZER-SPICER, a GKN subsidiary, in a plant for the manufacture of universal joints for the automotive industry.

180. PEUGEOT and THOMPSON-CSF have combined their vehicle electronics research interests in a jointly owned company. Peugeot has control with a holding over 50%.

181. PEUGEOT and RENAULT are joint owners of FRANCAISE DE MECANIQUE, producing engines at Douvrin.

182. RENAULT (75%) and PEUGEOT (25%) are joint owners of Societe de Transmissions Automatique, producing automatic transmissions for both companies.

183. PEUGEOT, RENAULT and VOLVO are equal partners in FRANCO-SUEDOISE DES MOTEURS, producing V6 engines at Douvrin for use by each company.

184. PEUGEOT and RENAULT are joint owners of AUTOMOTORES FRANCO-CHILENA, jointly producing vehicles in Chile.

185. PEUGEOT (16.58%) and RENAULT (32.3%) are part owners of SOMOCOA, Madagascar.

186. PEUGEOT and TOYO KOGYO each own 36.37% of ASIA AUTOMOBILES SND. BHD and both companies models are produced.

187. PEUGEOT, through CITROEN, have a 49% interest in CIMOS. Citroen kits are supplied and buy back agreement covers components.

188. PORSCHE is assisting SEAT in developing a range of engines, petrol and diesel, through 1100, 1300 and 1500cc variations. There are also plans for a 120hp turbocharged version of the 1500cc units.

189. PORSCHE use VOLKSWAGEN/AUDI components in the 924 but have elected to use their own engines in newer models. VW/AUDI market and distribute Porsche in many markets.

190. RELIANT Kitten 4-wheelers are supplied in kit form to SIPANI AUTOMOBILE (Sunrise) in Bangalore where they are assembled and sold as Dolphins.

191. RELIANT supply kits for 3-wheeled vehicles to TRIDENT MOTORS of Columbia, Ohio.

192. RELIANT has an agreement with SAPPHIRE MOTOR COMPANY of Bridgetown for assembly of the Fox Utility vehicle and distribution by Sapphire throughout the Caribbean Economic Community.

193. RENAULT has an agreement with China's number Two factory at Shiyan whereby an experiment vehicle, the EQD 142, based on a Chinese chassis but incorporating an EVI engine developing 100KW (133bhp) is being built. One hundred of these vehicles will be marketed in Cameroon by Renault in order to test the reaction of African markets. If successful, the production rate will be increased.

194. RENAULT and VOLKSWAGEN are to manufacture a new type of automatic gearbox from parts supplied by each partner. Renault will invest FFr 300m ($45m) and will make the electronic control systems and the converter. Volkswagen will invest DM 200m ($85m) and will make mechanical parts. Each company will build its own version from the jointly developed parts commencing in 1985, Renault 600 a day and Volkswagen 1,000 a day.

195. RENAULT has a 15% holding in VOLVO with an option to convert debentures into capital for a further 5% although this is not expected to happen before 1985. Volvo have a 10% holding in Renault Acceptance BV. There is some sharing of components and Volvo is responsible for distribution of Renault models in Scandinavia.

196. RENAULT INDUSTRIES EQUIPMENTS ET TECHNIQUES (49%) and RANSBURG CORPORATION (51%) are jointly manufacturing high technolocy industrial robots through a company called Cybotech.

197. RENAULT supplies engines to WARTBURG for vehicles intended for export.

198. RENAULT models are produced under licence at the Pitesti plant in Romania. DACIA models are baded on the R12 and Renault agreed a FFr 4 billion ($580m) deal for the expansion of the Romanian motor industry, including construction of a factory for pickup trucks.

199. RENAULT has a 40% interest in OYAK-RENAULT with OYAK holding 47% and a Turkish commercial bank the balance. Capacity has been set at 45,000 vehicles.

200. VOLKSWAGEN cars are distributed throughout Scandinavia through a joint marketing company held 33/67 with the Scania division of SAAB.

201. SAAB-SCANIA and VALMET jointly produce cars in Finland through Saab-Valmet at Uusikaupunki. Saab models are produced in addition to the Talbot models assembled.

202. SAME (67%) and HURLIMANN (33%) are joint owners of the LAMBORGHINI tractor operations in Italy.

203. SEAT have signed a co-operation agreement with VOLKSWAGEN for the production of VW models in Spain. The deal calls for production of 30,000 pa. Passat/Santana models, from the end of 1983 and 90,000 pa. Polo/Derby models - 50,000 of which will be exported through the VW network from early 1984. Local content will vary between 50 and 60%.

204. STEYR is to develop and assemble four-wheel drive light commercial vehicles based on the VOLKSWAGEN Type-2 transporter. VW will provide most components and body parts in kit form while Steyr will supply the four-wheel drive transmissions and associated parts.

205. The PAKISTAN AUTOMOBILE CORPORATION (PACO) has reached agreement with SUZUKI of Japan to assemble 800cc cars, vans and pick-up trucks. Suzuski will have a 10% holding and output is planned at 25,000 pa.

206. SUZUSKI is to invest $25m in a collaboration venture with MARUTI UDYOG for the production of small cars, vans, micro buses and pick-up trucks. The project will involve total investment of $278m. Suzuki will initially hold 25% of the equity with an option to increase to 40%. A licence agreement provides for the transfer of technology from Suzuki for the engineering, design and development and subsequent manufacture and sale in India of 800cc and 1000cc vehicles, 20,000 to be built in 1984, rising to 100,000 by 1988.

207. TENNECO has a 40% holding in POCLAIN, which has a marketing agreement with VOLVO concerning industrial construction machinery.

208. TOYO KOGYO is to jointly produce small trucks in Colombia with CIA, COLOMBIANA AUTOMOTRIZ, beginning May 1983. Toyo Kogyo will ship engines and other major parts for assembly of 3,000 vehicles a year at Bogota.

209. TOYOTA has reached agreement with the TAIWANESE GOVN. concerning production of 20,000 cars a year in Taiwan. Toyota will have a 45% stake in the company, with CHINA STEEL CORPORATION 25% and the balance held by private investors. Production should start in 1983 and could rise to 200,000 a year.

210. TOYOTA has reached an agreement with UNITED MOTOR WORKS to set up a joint venture company for the production and marketing of Toyota cars in Malaysia. UMW-TOYOTA Holdings will have a capital of $20m, of which 15% will be provided by Toyota and 52% by UMW. Production will be 20,000 pa. initially.

211. DELHI CLOTH and GENERAL MILLS (DCM) is to manufacture TOYOTA Commercial vehicles in India through a joint venture company.

212. VOLVO and VALMET have merged their tractor manufacturing operations into a company called SCANTRAC, now controlled by Valmet but manufacturing tractors jointly.

213. VOLKSWAGEN has signed a basic deal with China whereby up to 20,000 Santana cars and 100,000 engines a year could be built by the SHANGHAI TRACTOR and AUTOMOBILE CORPORATION. If the deal is successful, full output will commence in 1988, VW taking a 50% holding. There will be some barter involved in the deal.

214. VOLKSWAGEN owns 49% of TAS and Gold and Jetta models are produced. VW are building pick-ups in Yugoslavia that are normally only produced in the USA for distribution in Europe, mainly in the U.K.

215. VOLKSWAGEN is forming a joint venture company with Egyptian partners to build a $40m assembly plant at Amerya, outside Alexandria. VW will hold 40% of the venture which should build 20,000 vehicles pa. when completed in 1983. In the meantime VW models are being produced in Egypt by ARAB AMERICAN MOTORS, until the plant is completed.

216. In 1981, VOLVO acquired most of the assets of WHITE MOTOR CORPORATION and have formed a new company, Volvo-White Truck. Both companies vehicles are being produced.

217. YAMAHA have established a joint venture company with the BANESTO Group of Spain. Called Sociedad Espanola de Motocicletas, the company will make 20,000 a year motorcycles, from 125cc to 400cc at Hospitalet, Barcelona.

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